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A Study of Classroom Literacy Interventions and Outcomes in Even Start

ies NATIONAL CENTER FOR EDUCATION EVALUATION AND REGIONAL ASSISTANCE
Institute of Education Sciences

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EXECUTIVE SUMMARY

The Even Start Family Literacy Program was established in 1989 (P.L. 107-110, Sec. 1231) to help break the cycle of poverty and illiteracy for low-income families, by improving the literacy skills of parents and their young children (U.S. Department of Education 2003). Even Start projects offer family literacy services, defined as four integrated instructional components (P.L. 107-110, Sec. 9101 (20)):

- Early Childhood Education (ECE);
- Parenting Education (PE);
- Parent-Child Literacy Activities (PC); and
- Adult Education (AE).

Two previous studies of the Even Start Program showed that parents and children who participated in Even Start did not have better literacy outcomes than parents and children in a randomly assigned control group that did not receive Even Start services. The Even Start Classroom Literacy Interventions and Outcomes (CLIO) Study is the third randomized study of Even Start. As opposed to the earlier evaluations that investigated the effectiveness of Even Start relative to randomly assigned control groups in which parents and children were not enrolled in Even Start, the CLIO study was intended to intervene by offering the combination of research-based, literacy-focused early childhood education and parenting education curricula (the "CLIO combined curricula"). The CLIO study was intended to determine (1) whether the CLIO combined curricula were more effective than existing Even Start instructional services, and (2) whether research-based parenting education curricula that focus on child literacy (the "CLIO parenting curricula") added value to research-based, literacy-focused early childhood education curricula (the "CLIO preschool curricula").

This report presents 2-year impacts of the CLIO curricula on child language, literacy, and social competence; parenting skills; parent literacy; and instructional practices and participation in preschool and parenting classes.

Main Findings

The main findings from the CLIO impact analyses are that (1) the CLIO combined curricula had statistically significant, positive impacts on some of the hypothesized precursors to the development of children's early literacy skills, including instructional supports for literacy, child social competence, and parenting skills; but (2) the CLIO combined curricula did not have statistically significant impacts on any of the child language development and early literacy outcomes.

The CLIO combined curricula had statistically significant positive impacts on

- two of five measures of preschool instruction: support for print knowledge and literacy resources in the classroom;
- one of three measures of parenting instruction: the amount of parenting education time spent on child literacy;
- both measures of parenting outcomes: parent interactive reading skill and parent responsiveness to their child; and
- child social competence.

The CLIO combined curricula did not have statistically significant impacts on:

- three of five measures of preschool instruction: support for oral language, support for phonological awareness, and support for print motivation;
- two of three measures of parenting instruction: the amount of parenting education time spent on parenting skills not related to child literacy or the amount of parent-child time spent with parents and their children interacting on child literacy activities;
- monthly hours of preschool instruction received by children or monthly hours of parenting instruction received by parents;
- parent English reading skills (includes vocabulary); and

- child expressive language (in English or Spanish), receptive vocabulary, phonological awareness (Elision or Blending), print knowledge, or syntax and grammar.

The CLIO parenting curricula added value to the CLIO preschool curricula by increasing significantly the amount of parenting education time spent on child literacy, the amount of parenting education time spent on parenting skills not related to child literacy, and parent interactive reading skill. The CLIO parenting curricula did not significantly add value to the CLIO preschool curricula with respect to parent responsiveness, child literacy outcomes, or child social competence.

Background

The Even Start Family Literacy Program provides grants to local projects to provide family literacy services to low-income families. Family literacy services are defined as the integration of the four instructional services mentioned above with sufficient intensity in terms of hours and duration to make sustainable changes in a family. An important premise underlying the Even Start program is that the combination of early childhood education, parenting education, parent-child literacy activities, and adult education adds value to participant outcomes. That is, language and literacy outcomes for children in Even Start should be improved directly, through the effects of participation in preschool, and indirectly, through enhancements in both parenting skills and parent literacy. Parenting skills are expected to be enhanced through participation in parenting and parent-child activities, and parent literacy through participation in adult education literacy training.

Since the inception of Even Start in 1989, the U.S. Department of Education has sponsored three national evaluations of the program that focused on performance and effectiveness. Two of the three national evaluations included experimental studies that randomly assigned eligible and interested families to participate in Even Start or a control group of families who would delay participation in Even Start for at least 1 year (St.Pierre et al. 2003; St.Pierre et al. 1995). The results of these studies showed that Even Start projects were not effective at improving the literacy skills of participating preschool-age children and their parents. That is, literacy gains made by Even Start parents and children were no different from literacy gains made by control parents and

children. The control group for these randomized studies was composed of parents who wanted to enroll their children in Even Start but who were randomly assigned to participate in Even Start in the year following the evaluation. About two-thirds of these control parents were unable to arrange any other formal early childhood education (ECE) services during the period of the evaluation, so the control condition mostly corresponded to at-home care by parents or extended family members (St.Pierre et al. 2003, p. 162).

The absence of significant effects of Even Start on literacy skills, along with new requirements in the reauthorized Even Start legislation to base instruction on scientifically based reading research (Sec. 1231(2)(D)), prompted an examination of the Even Start model to determine how it could be improved. The lead investigators of the most recent national Even Start evaluation (St.Pierre, Ricciuti, and Rimdzius 2005) addressed several questions about Even Start's apparent ineffectiveness: (1) whether the Even Start model was fully implemented, (2) whether Even Start's instructional services were sufficiently intensive, (3) whether Even Start families participated sufficiently, and (4) whether the quality of Even Start's instruction and curriculum content was sufficient to lead to positive effects.

The CLIO study was, therefore, designed to test the extent to which research-based, literacy-focused curricula strengthen Even Start services and lead to significant impacts on parents and children.[1] Specifically, the CLIO study was designed to address two primary research questions:

- Is the combination of research-based, literacy-focused preschool, parenting, and parent-child curricula (the CLIO combined curricula) more effective than the existing combination of services in Even Start?
- Do research-based parenting and parent-child curricula (the CLIO parenting curricula) that focus on child literacy add value to the CLIO preschool curricula?

[1] This is consistent with Even Start's second legislative evaluation requirement (Sec. 1239 (2)), which is to identify effective programs that can be duplicated and used in providing technical assistance. CLIO is also consistent with the requirement for research (Sec. 1241) that examines successful family literacy services.

Thus, the study was an evaluation of the *incremental* effectiveness of providing the CLIO curricula to Even Start projects.

CLIO Study Design and Curricula

Through a competitive process, the CLIO study selected two combined preschool and parenting education curricula,[2] each of which were based on the most current research on the development of children's early literacy skills. CLIO used these curricula in four combinations—two that implemented the combined research-based preschool and parenting curricula and two that implemented the research-based preschool curricula in combination with existing parenting education services. The CLIO study used an experimental design in which 120 Even Start projects were randomly assigned to implement one of the four CLIO curricula combinations or to be in a control group that provided their regular pre-CLIO instructional services (see table ES-1).

The CLIO combined curricula and CLIO preschool curricula were implemented in the sample of Even Start projects during program years 2004-2005 and 2005-2006. Implementation included summer training sessions for project directors and teachers in each year, as well as ongoing support for preschool and parenting education staff from the curriculum developers over the 2-year period.

The CIRCLE group at the University of Texas-Houston Health Sciences Center teamed with Abrams & Company Publishers to provide the Let's Begin with the Letter People preschool curriculum to CLIO. Let's Begin is a preschool curriculum that builds early literacy skills and uses 26 imaginary characters that represent the letters of the alphabet. The CIRCLE group provided the Play and Learning Strategies (PALS) parenting curriculum to CLIO. PALS focuses on responsive parenting and teaches parents techniques to build their children's language and cognitive development.

[2] The study team decided not to include Even Start's adult education component in the test of research-based curricula because (1) most projects provided a variety of adult education services at different levels (adult basic education (ABE), general equivalency diploma (GED), English as a second language (ESL)) to meet family needs, (2) a substantial portion of projects used community service providers to deliver adult education services, and (3) the research on effective adult education models is still in its infancy.

Table ES-1. Specification of the Five CLIO Study Groups

Even Start instructional component	Study group				
	Group 1	Group 2	Group 3	Group 4	Group 5
	LET'S BEGIN with the Letter People (ECE) CLIO preschool curriculum	LET'S BEGIN with the Letter People and Play and Learning Strategies (PALS) (ECE/PE) CLIO combined curriculum	Partners for Literacy (ECE) CLIO preschool curriculum	Partners for Literacy (ECE/PE) CLIO combined curriculum	Control
Early childhood education	LET'S BEGIN	LET'S BEGIN	Partners for Literacy	Partners for Literacy	As usual
Parenting education	As usual	PALS	As usual	Partners for Literacy	As usual
Parent-child joint literacy activities	As usual	PALS	As usual	Partners for Literacy	As usual
Adult education	As usual	As usual	As usual	As usual	As usual
NOTE: Shaded areas identify instructional components that were provided by the CLIO curriculum developers.					

The University of North Carolina at Chapel Hill provided the Partners for Literacy curriculum to CLIO. The preschool Partners curriculum is based on game-like activities conducted with pairs of children and instructional strategies designed to support children's cognitive and language development. The parenting Partners curriculum adapts the game-like activities and instructional strategies from the preschool curriculum and trains parents to use these with their children at home. The Partners curriculum also includes training in problem-solving skills for children and parents.

CLIO Contrasts

As discussed earlier, the CLIO study addressed two key research questions:

1) Is the combination of research-based, literacy-focused preschool, parenting, and parent-child curricula (the CLIO combined curricula) more effective than the existing combination of services in Even Start?

2) Do research-based parenting and parent-child curricula (the CLIO parenting curricula) that focus on child literacy add value to the CLIO preschool curricula?

The first research question was addressed analytically by combining projects that received the CLIO combined curricula (study groups 2 and 4 in table ES-1) and comparing their outcomes with those of control projects (study group 5). The study's second research question was addressed analytically by combining projects that received the CLIO combined curricula (study groups 2 and 4), and comparing their outcomes with those of projects that received the CLIO preschool curricula (study groups 1 and 3).

CLIO Data Collection and Outcome Constructs

The study team collected data over a 3-year period. The first year of data collection was 2003-2004, prior to implementation of the CLIO curricula. The second and third years of data collection (2004-2005 and 2005-2006) corresponded to the two CLIO curricula implementation years.[3]

The study team conducted the following types of data collection in all CLIO projects: direct assessments of child language and literacy; teacher ratings of child social competence; videotapes of parent-child interactions; interviews of parents; direct assessments of parent literacy; observations of classroom instruction in preschool, parenting education, and parent-child classes; surveys of teachers and project directors; and tallies of child and parent participation in instructional services. The study team also observed and rated the fidelity of implementation of the CLIO curricula. The outcome constructs used in the CLIO impact analyses are presented in table ES-2.

[3] The CLIO study is also following children into kindergarten and first grade.

Table ES-2. CLIO Outcome Measures

	Outcome		Data collection instrument	Mode of data collection	Domain
CHILD	1	Expressive language: English	Individual Growth and Development Indicator (IGDI)	Child assessment	Emergent literacy
	2	Expressive language: Spanish			
	3	Receptive vocabulary	Peabody Picture Vocabulary Test (PPVT)		
	4	Phonological awareness: Elision	Comprehensive Test of Phonological and Print Processing (Preschool – CTOPPP)		
	5	Phonological awareness: Blending			
	6	Print knowledge			
	7	Syntax and grammar	Test of Language Development (TOLD-3)		
	8	Social competence	Teacher rating form	Teacher rating	Socio-emotional development
PARENT	9	Parent interactive reading skill	Read Aloud Together Profile & Parent Interview	Video observation, parent report	Parenting skills
	10	Parent responsiveness			
	11	Reading & vocabulary skill	Parent assessment battery	Parent assessment	Parent language & literacy
INSTRUCTIONAL	12	Support for oral language development	Observation Measures of Language and Literacy Instruction (OMLIT) and Parenting Education and Child/Parent Observation (PECAP)	Classroom observation	Preschool classroom instruction
	13	Support for print knowledge			
	14	Support for phonological awareness			
	15	Support for print motivation			
	16	Literacy resources in classroom			
	17	Parenting education time spent on child literacy			Parenting classroom instruction
	18	Parenting education time spent on parenting skills			
	19	Parent-child time spent interacting on child literacy activities			Parent-child classroom instruction
	20	Child: Monthly hours of preschool instruction received	Instructional Services Participation Form (ISPF)	Project report	Participation amount
	21	Parent: Monthly hours of parenting and parent-child instruction received			

Implementation of the CLIO Curricula

Fidelity to Planned CLIO Curricula. Fidelity of implementation to the CLIO curricula in the sample projects was rated both by independent observers and by the curriculum developers. Both sets of ratings indicated that, on average, implementation of the CLIO combined curricula and the CLIO preschool curricula only reached about 50 percent of full implementation. Fidelity ratings for the Let's Begin and PALS projects were generally higher than those for the Partners for Literacy projects, for both the preschool and parenting classrooms but particularly for preschool classrooms. Most of the average fidelity ratings by observers and developers were higher in 2006 than in 2005 with the exception of observer ratings for Partners for Literacy preschool classrooms.

Exposure to the CLIO Curricula. Participants (parents and children) in any intervention need a minimum level of exposure to the curriculum to obtain the hypothesized benefits. Even Start guidelines do not specify an expected level of exposure for children or parents, and the hours of instruction offered by local projects vary widely. In each implementation year, while projects reported that they offered preschoolers an average of 80 hours of preschool education per month, children in CLIO projects actually participated in preschool an average of 50 hours per month. Parents also received only partial exposure to the parenting curricula. Projects reported that they offered parents an average of 25 hours of parenting education and parent-child activities per month, but parents participated for an average of 13 hours of parenting education and parent-child activities per month. These levels of participation relative to hours of services offered are in line with what was documented in previous Even Start evaluations (St.Pierre et al. 2003, p. 129).

Control Projects. Project directors reported that about 75 percent of the CLIO control projects used a formal early childhood curriculum (most often High/Scope or Creative Curriculum), and about 60 percent used a formal parenting curriculum (most often locally developed). Observations of control classrooms showed that they spent about 45 percent of the day in activities that are often considered by developmental psychologists to have particularly high value for children because of the opportunities for children to construct knowledge and receive feedback on their interactions with materials, peers, and adults in the classroom (Bruner and Watson 1983). The remainder

of the control group day was spent in daily group activities including review of the calendar/weather/attendance, gross motor play and transition, and meals/snacks.

Impact Findings

Impacts of the CLIO Combined Curricula. The study showed that Even Start projects assigned to the CLIO combined curricula did not exhibit better child language and literacy outcomes than Even Start projects assigned to the control group (figure ES-1). In the figures in this section, effect sizes for the combined curricula are indicated by filled diamonds (relative to the control group) and open circles (relative to the preschool curricula), and 95 percent confidence intervals[4] are shown as horizontal bands on either side of the diamond or circle. Effect size indicates the difference in outcome between the average subject who received the treatment and the average subject who did not.[5]

There were no statistically significant impacts of the CLIO combined curricula on any of the seven measures of child language and literacy skills (six in English and one in Spanish), as can be seen by the fact that none of the confidence bands exclude zero, even before adjustment for multiple comparisons. Estimated effect sizes on emergent literacy outcomes were all smaller than 0.13 in absolute value, with confidence interval limits all bounded by 0.27 in absolute value. However, the CLIO combined curricula did have a statistically significant positive effect on child social competence (behavior in class) as rated by preschool teachers. The effect size of the impact of the CLIO combined curricula on child social competence was 0.22.

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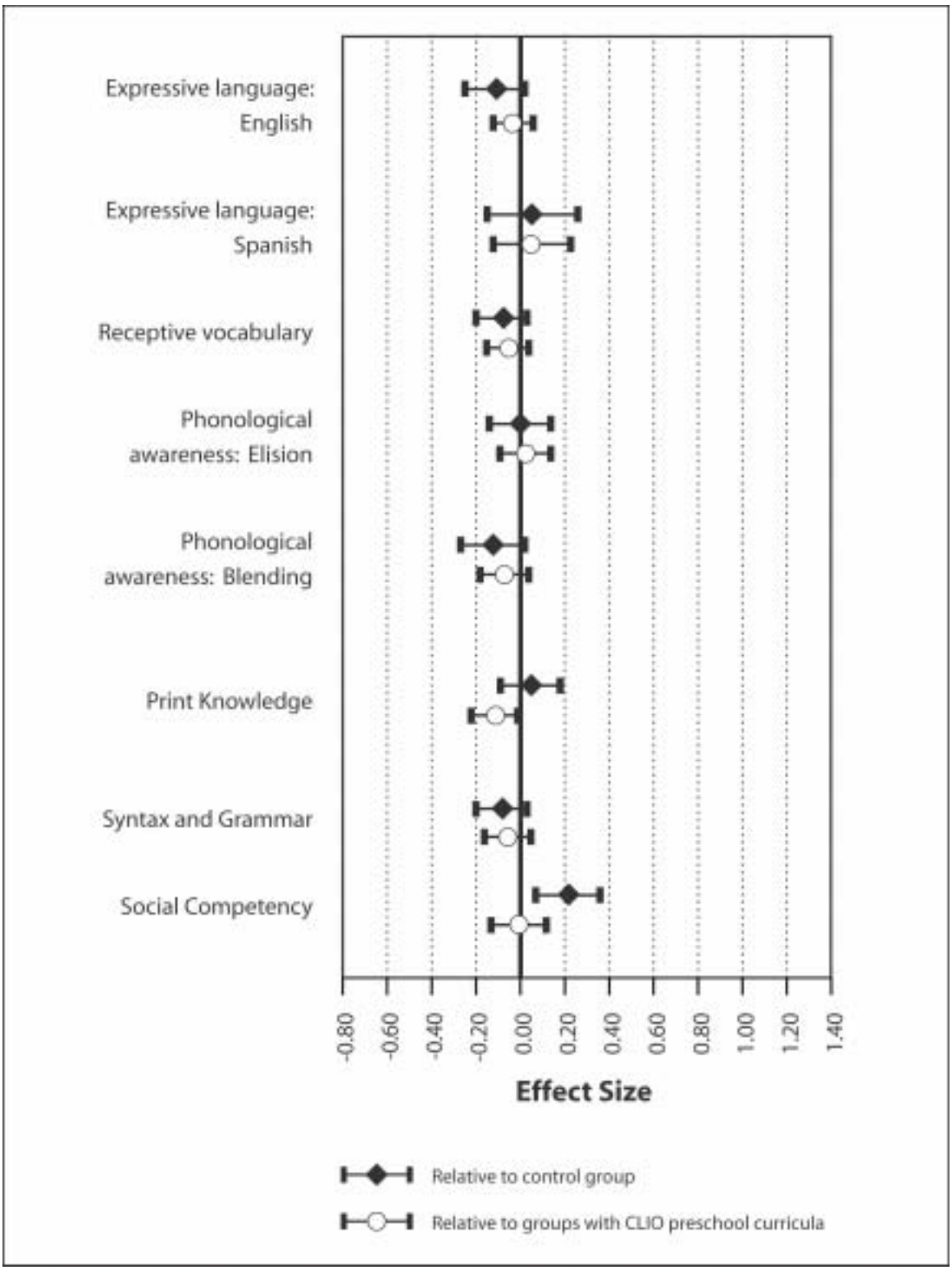
[4] The confidence intervals may be interpreted as follows. If the experiment were to be independently repeated a very large number of times under the same general conditions, drawing on the same population of schools and students, and on every repetition both an effect estimate and a confidence interval on that estimate were calculated, then, over the long run, 95 percent of the confidence intervals would contain the long-run average of estimated effects.

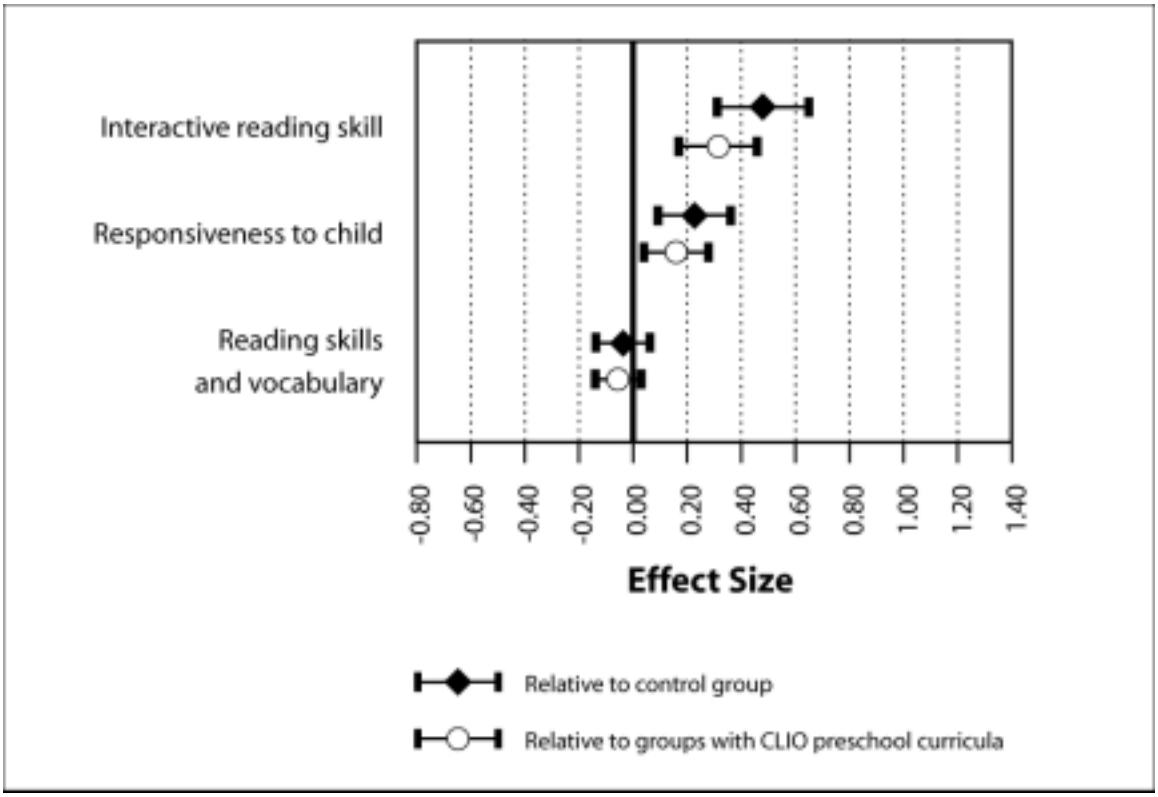
[5] Effect size was calculated by taking the difference between the treatment and control group means and dividing that difference by the standard deviation of the control group's scores in 2005.

Figure ES-1. Effect Sizes for CLIO Combined Curricula on Child Outcomes Relative to Both the Control Group and the CLIO Preschool Curricula (average of spring 2005 and spring 2006)



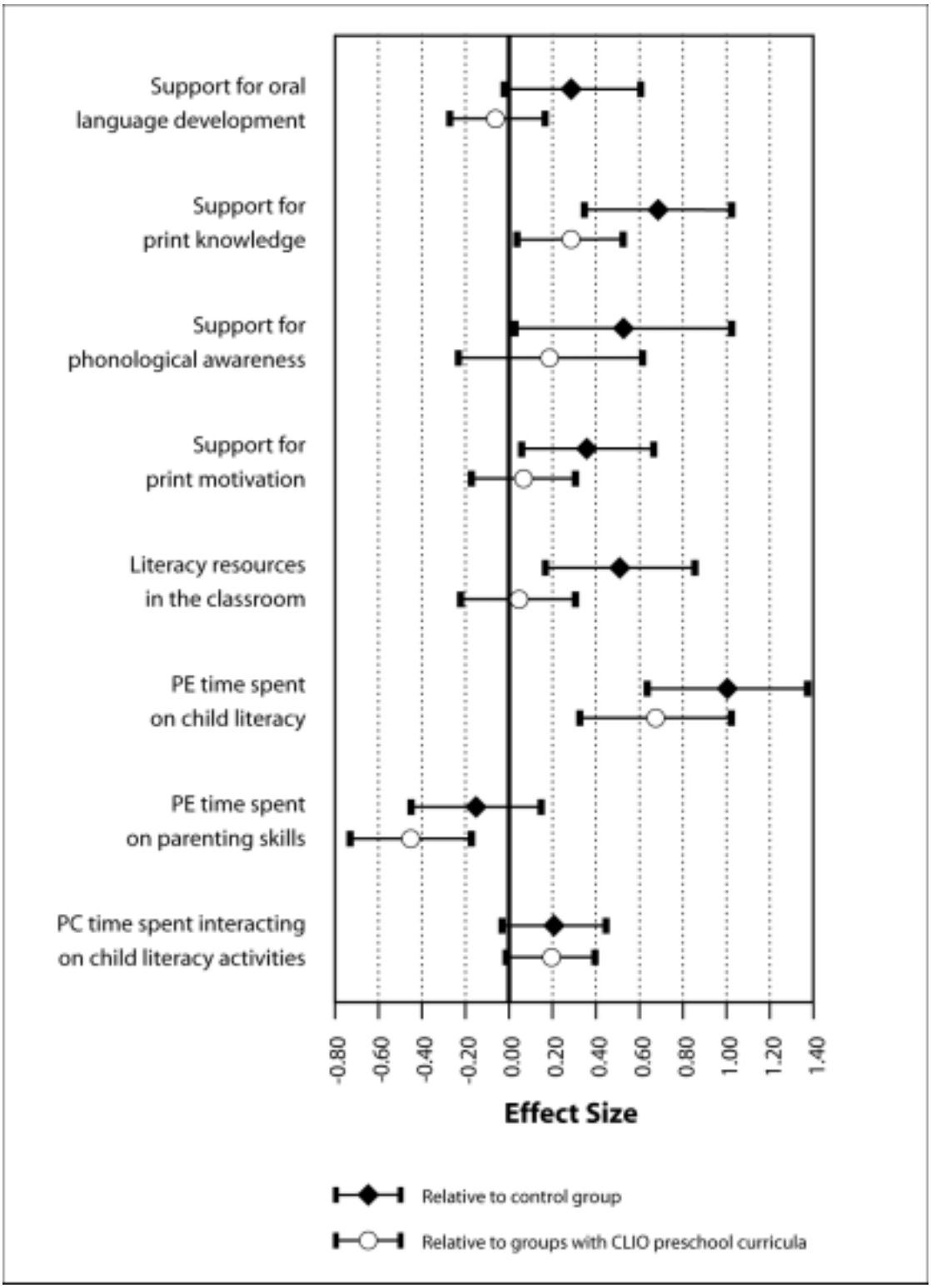
The CLIO combined curricula had a statistically significant positive impact on both of the parent outcomes examined (figure ES-2). The effect size of the impact on parent interactive reading skill was 0.48, and the effect size of the impact on parent responsiveness to their child was 0.22. Even though CLIO did not manipulate adult education curricula, the study assessed parent reading skills and vocabulary and showed that the CLIO combined curricula did not have a statistically significant impact on these skills (figure ES-2).

Figure ES-2. Effect Sizes for CLIO Combined Curricula on Parent Outcomes Relative to Both the Control Group and the CLIO Preschool Curricula (average of spring 2005 and spring 2006)



The CLIO combined curricula had a statistically significant positive impact on two of five measures of instructional support for literacy development in preschool classrooms (figure ES-3). The effect sizes of the statistically significant impacts on support for print knowledge and literacy resources in the classroom were 0.69 and 0.52, respectively. There was no statistically significant impact on the following three

Figure ES-3. Effect Sizes for CLIO Combined Curricula on Instructional Outcomes Relative to Both the Control Group and the CLIO Preschool Curricula (average of spring 2005 and spring 2006)



preschool instructional measures: support for oral language development, support for phonological awareness, or support for print motivation.[6]

The CLIO combined curricula had a positive impact on one of the three measures of parenting education and parent-child classroom instruction (figure ES-3). The effect size of the impact on the amount of parenting education time spent on child literacy was 1.01. There was no statistically significant impact on the amount of parenting education time spent on parenting skills not related to child literacy or the amount of parent-child time spent with parents and their children interacting on child literacy activities.

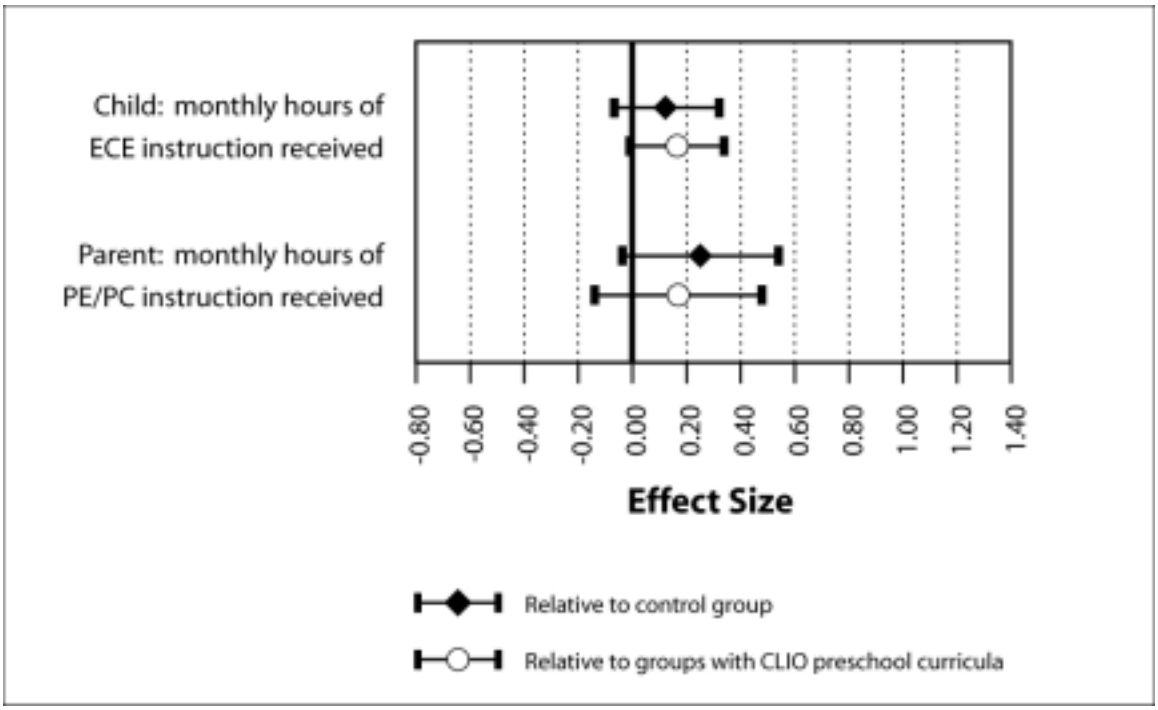
The study also examined whether the CLIO combined curricula had an impact on participation levels (figure ES-4). The results showed that there was no statistically significant impact of the CLIO combined curricula on either child levels of participation in preschool or parent levels of participation in parenting education or parent-child activities. Neither of the confidence bands exclude zero.

Added Value of the CLIO Parenting Curricula. CLIO parenting curricula did not add significantly to the effectiveness of the CLIO preschool curricula on any of the seven measures of child literacy skills or on child social competence (figure ES-1). That is, adding research-based parenting components focused on child literacy did not add significantly to children's outcomes beyond what was achieved with the CLIO preschool curricula. (In figures ES-1 through ES-4, the effect sizes for the added value of the CLIO parenting curricula are indicated by open circles.) The estimated effect sizes of the CLIO parenting curricula on emergent literacy outcomes were all smaller than 0.11 in absolute value, with confidence interval limits all bounded by 0.23 in absolute value.

However, the CLIO parenting curricula did have a statistically significant positive incremental effect on parent interactive reading skill (effect size of 0.30) (figure ES-2). The difference on parents' responsiveness to their child between the CLIO combined curricula and the CLIO preschool curricula, while similar in size to the statistically significant difference between the CLIO combined curricula and the control group, was not statistically significant.

[6] Although the confidence bands for support for phonological awareness and support for print motivation exclude zero, the effect sizes are not significant once adjusted for multiple comparisons.

Figure ES-4. Effect Sizes for CLIO Combined Curricula on Participation Relative to Both the Control Group and the CLIO Preschool Curricula (average of spring 2005 and spring 2006)



There were statistically significant incremental effects of the CLIO parenting curricula on two of the instructional measures. The effect sizes of the incremental effects of the CLIO parenting curricula on the amount of parenting education time spent on child literacy and the amount of parenting education time spent on parenting skills not related to child literacy were 0.68 and -0.45, respectively (figure ES-3). There was no statistically significant incremental effect of the CLIO parenting curricula on how time was spent in parent-child classes or (as expected) in preschool classes.

Finally, the CLIO parenting curricula did not have a statistically significant incremental effect on child participation in preschool or on parent participation in parenting education (figure ES-4).

Secondary Analyses

Three secondary analyses were conducted to examine the variation in impacts of the CLIO curricula.

Year of Implementation. One hypothesis of the CLIO study was that impacts might be greater in the second year, when most projects could be assumed to have had 2 years to reach full implementation. With respect to child outcomes, there is evidence that the CLIO combined curricula had statistically significant negative effects on four of the seven children's language and literacy outcomes in the first year of implementation. By the second year, rough parity with the control group was achieved. There is little evidence of differential effects by year for child social competence, parent outcomes, instructional outcomes, and participation.

Analysis of Growth for Child and Parent Outcomes. While the primary impact analysis measures parent and child outcomes at the end of preschool, the study also examined impacts on the pattern of growth from fall to spring. The only significant finding was that the CLIO parenting curricula had a positive incremental effect on parent responsiveness to their child.

Interactions of Study Group with Ethnicity and Home Language. About half of all children in the CLIO sample spoke a home language other than English. An analysis of interactions found that impacts on children's emergent literacy did not vary significantly as a function of home language or ethnicity.

Summary

Prior studies have established that Even Start does not have statistically significant impacts on children's emergent literacy or on parent literacy. The CLIO study investigated whether the implementation of research-based, literacy-focused curricula would improve literacy outcomes for Even Start children and parents. Although there were positive impacts on some of the literacy supports in preschool classrooms, on time spent on child literacy in parenting education classes, on parenting skills, and on children's social competence, there were no statistically significant impacts on children's language and literacy. There was no evidence that the failure to

find impacts on these core outcomes was due to a lack of fidelity in the treatment classrooms or cross-over in the control classrooms.

ACKNOWLEDGMENTS

This report is the culmination of several years of design, data collection, and analysis. We gratefully acknowledge the contributions of a significant number of individuals in its preparation and production.

We benefited from the advice of a Technical Work Group. Members have included: Marilyn Box, (formerly) Mesa Public Schools Even Start; Gene Brody, University of Georgia; Thomas Cook, Northwestern University; Lilli Copp, (formerly) Florida State Department of Education; David Francis, University of Houston; Larry Hedges, Northwestern University; Sue Henry (formerly) New York State Department of Education; Chris Lonigan, Florida State University; Robin Morris, Georgia State University; Lynne Vernon-Feagans, University of North Carolina; Barbara Wasik, Johns Hopkins University; Lin Wrinkle, Taylor, Texas Even Start.

Numerous individuals at Westat and Abt Associates contributed in a multitude of ways to the successful conduct of this study. From Westat, design and analysis advice was provided by Alexander Ratnofsky and Camilla Heid. Recruitment was successfully led by Carin Celebuski. Data collection was capably managed by Juanita Lucas-McLean. Field managers over the rounds of data collection included Laura Collins, Katia Cruz, Julie Daft, Sabrina Daly, Karen Gray-Adams, Luis Romero, Sylvia Segovia, and Dawn Thomas-Banks. Participation data were collected and edited by Cathy Lease. The many data systems were designed and implemented under the direction of Patricia Nicchitta, with the assistance of Kanaka Durga and Ying Long. Analysis and statistical support was provided by Jiaquan Fan, Philip Fletcher, and Frank Jenkins. Expert editorial and production assistance was provided by Evarilla Cover and Saunders Freeland. From Abt Associates, Carolyn Layzer helped conceive and develop the OMLIT observation system and also helped train and manage its administration in the field. Anne Robertson played a similar role for the PECAP observation system. Cristofer Price provided analysis and technical support. Programming and database management for the classroom observation data were led by Nancy McGarry and Amanda Parsad.

We were also assisted in this undertaking by a number of individuals from two other organizations, XTRIA and the CDM Group. Both organizations provided several staff who capably assisted in the recruitment of Even Start projects and in the training of data collection staff.

Patricia McKee of the U.S. Department of Education's Office of Elementary and Secondary Education and her staff served as important liaisons with the Even Start State coordinators. The Even Start State coordinators provided support throughout recruitment and data collection. Most importantly, this study would not have been possible without the 3-year commitment of the Even Start projects that agreed to participate in the CLIO study. Their willingness to participate for 3 years is truly appreciated by all of us connected to this study.

Disclosure of Potential Conflicts of Interests[7]

The research team for this evaluation consists of a prime contractor, Westat, and a subcontractor, Abt Associates. Neither of these organizations or their key staff has financial interests that could be affected by findings from the Even Start Classroom Literacy Interventions and Outcomes Study.

No one on the Technical Work Group, convened to provide advice and guidance, has financial interests that could be affected by findings from the evaluation. One of the members of the study's Technical Work Group, Dr. Christopher Lonigan of Florida State University, is the lead author on the Test of Preschool Early Literacy. The CLIO study used components of a prepublication version of this assessment called the Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP).

[7] Contractors carrying out research and evaluation projects for IES frequently need to obtain expert advice and technical assistance from individuals and entities whose other professional work may not be entirely independent of or separable from the particular tasks they are carrying out for the IES contractor.

Contractors endeavor not to put such individuals or entities in positions in which they could bias the analysis and reporting of results, and their potential conflicts of interest are disclosed.

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1. BACKGROUND

In this chapter, we discuss the Even Start program, the purpose of the current study, and the organization of the remainder of the report.

The Even Start Program

The Even Start Family Literacy Program was established in 1989 with the goal of improving the academic achievement of low-income young children and their parents, especially in the area of reading (U.S. Department of Education 2003). Even Start projects offer four integrated instructional activities for low-income families:

- age-appropriate early childhood education to prepare children for success in school and life experiences (early childhood education, or ECE);
- training for parents regarding how to be the primary teacher for their children (parenting education, or PE);
- interactive literacy activities between parents and their children (parent-child literacy activities, or PC); and
- parent literacy training that leads to economic self-sufficiency (adult education, or AE).

The underlying premise of Even Start, and of the family literacy model more generally, is that these four instructional components are necessary for improved child literacy and are maximally effective when integrated into a unified program. That is, child language and literacy should be improved directly, through participation in ECE, and indirectly through improvements in both parenting skills and parent literacy. Parenting skills are expected to be improved through participation in PE and PC activities, and parent literacy through participation in AE. Also, Even Start services[1] are to be of "sufficient intensity in terms of hours, and of sufficient duration, to make sustainable changes in a family."

[1] Family literacy services are defined in Sec. 203 of Title II of *The Workforce Investment Act of 1998*, Public Law 105-220, also known as the *Adult Literacy and Family Education Act of 1998*.

Even Start Has Not Performed Up To Expectations

Since 1989, the U.S. Department of Education (ED) has sponsored three national evaluations of the Even Start program that focused on performance and effectiveness. Two random assignment studies that were part of these evaluations (St.Pierre et al. 1995; St.Pierre et al. 2003) showed that Even Start projects were not effective at improving the literacy skills of participating preschool-age children and their parents. That is, literacy gains made by Even Start parents and children were no different from literacy gains made by control parents and children. The control group for these randomized studies was composed of parents who wanted to enroll their children in Even Start but who were randomly assigned to participate in Even Start in the year following the evaluation. About two-thirds of these control parents were unable to arrange any other formal ECE services during the period of the evaluation, so the control condition mostly corresponded to at-home care by parents or extended family members.[2]

The absence of significant effects on literacy skills prompted an examination of the Even Start model to determine how it could be improved. The lead investigators of the most recent national evaluation of Even Start (St.Pierre, Ricciuti, and Rimdzius 2005) addressed several questions that might explain Even Start's apparent ineffectiveness: (1) whether the Even Start model was fully implemented, (2) whether Even Start's instructional services were sufficiently intensive, (3) whether Even Start families participated sufficiently, and (4) whether the quality of Even Start's instruction and curriculum content was sufficient to lead to positive effects.

Data from the national evaluation showed that Even Start projects were, indeed, able to fully implement the program, and that Even Start projects offered instructional services at a level of intensity that is comparable to mainstream programs offering the individual parts of a family literacy program. However, the evaluation also documented that Even Start families participated at low levels and for a relatively short period of time. Further, evaluation data showed that Even Start's instructional services were not of uniformly high quality. In particular, the national evaluation found that (1) Even Start's early childhood education programming was not of higher quality than the instruction received by control children and was not of higher quality than the

[2] See page 162 of St.Pierre et al. (2003).

instruction received by Head Start children, (2) the adult education programs provided to Even Start parents varied widely in their quality and the extent to which they focused on literacy, and (3) the parenting education programs offered by Even Start projects were similar in content and delivery systems to mainstream parenting programs, which have little research evidence on the extent to which they are effective at enhancing either parenting skills or child literacy. On the basis of these findings, the evaluators suggested that one promising avenue for improving Even Start would be to increase the extent to which Even Start's instructional services focus on literacy.

The CLIO Study: Seeking to Improve Even Start

The Even Start Classroom Literacy Interventions and Outcomes (CLIO) Study is the third randomized study of Even Start. Prior studies have investigated the effectiveness of Even Start relative to control groups in which parents and children were not enrolled in Even Start. In contrast, the CLIO study examined the effectiveness of four different curricular packages against the "regular" Even Start program. These curricular packages featured research-based literacy instruction. Two of the packages focused solely on early childhood education instruction, while the other two packages combined instruction in early childhood education with instruction in Even Start's two parenting components. This approach is supported by the strengthened mandate of Even Start from the *Literacy Involves Families Together Act* (*LIFT* 2001) and the *No Child Left Behind Act* (*NCLB* 2001), which call for Even Start projects to provide

- high-quality, intensive instructional programs,
- instructional programs based on scientifically based reading research, and
- reading readiness activities based on scientifically based reading research.

In addition, the CLIO study is consistent with Even Start's second legislative evaluation requirement, which is "to identify effective Even Start programs … that can be duplicated and used in providing technical assistance to Federal, State, and local

programs.[3] The CLIO design is also consistent with the research goals and methods with respect to the components of successful family literacy services: [4]

Preschool and parenting instruction were manipulated to construct four distinct experimental curricula:

- Two CLIO combined curricula that focused on child literacy both in preschool and parenting instruction. These were each a combination of a CLIO preschool curriculum and a CLIO parenting curriculum.
- Two CLIO preschool curricula that had an intense focus on child literacy but left parenting instruction alone. These were each a combination of a CLIO preschool curriculum and whatever approach to parenting instruction was already in use at the Even Start projects.

In keeping with Even Start's four-component family literacy approach, all of the Even Start projects participating in the CLIO study continued to provide AE to parents, but the AE instruction was not changed as part of the CLIO study.

The CLIO study addresses two primary research questions:

1) Is the combination of research-based, literacy-focused preschool, parenting, and parent-child curricula (the CLIO combined curricula) more effective than the existing combination of services in Even Start?
2) Do research-based parenting and parent-child curricula (the CLIO parenting curricula) that focus on child literacy add value to the CLIO preschool curricula?

Thus, CLIO is an evaluation of the incremental effectiveness of providing these research-based literacy-focused instructional services, over and above the existing instruction provided by Even Start projects.

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[3] Evaluation goal #2 under Sec. 1239 of the *No Child Left Behind Act of 2001*, Public Law 107-110.

[4] Sec. 1241 of the *No Child Left Behind Act of 2001*, Public Law 107-110.

The conceptual model for the CLIO study (figure 1-1) builds on the premise that Even Start improves child outcomes both directly (through ECE participation) and indirectly (through parenting and adult education). The oblongs on the left hand side of the model illustrate the instructional services that CLIO sought to improve (ECE, PE, and PC). The next three boxes show that the CLIO curricula are hypothesized to improve the instructional practices of staff working with Even Start children and parents. Improved instructional practices are hypothesized to lead to short-term enhancements, by the end of preschool, in children's development and in parent behaviors and skills. Improvements in parenting skills also were hypothesized to enhance children's development.[5] The AE instruction provided to Even Start parents was not changed as part of the CLIO study; however, the family literacy model assumes that AE produces improvements in parents' literacy and educational levels, which contribute to enhanced child development.[6] This relationship is represented in the three boxes along the bottom of the model.

The model includes longer term impacts, since the hypothesis is that changes in children's development and skills by the end of preschool will result in improved reading and language skills in the early school grades. Longer term changes in parenting skills and in parents' improved literacy and education are hypothesized to support these improved child outcomes. IES is interested in exploring whether there is support for these hypotheses, and so is conducting a follow-up study to address the question: Do the CLIO curricula produce positive effects at the end of kindergarten or at the end of first grade?[7]

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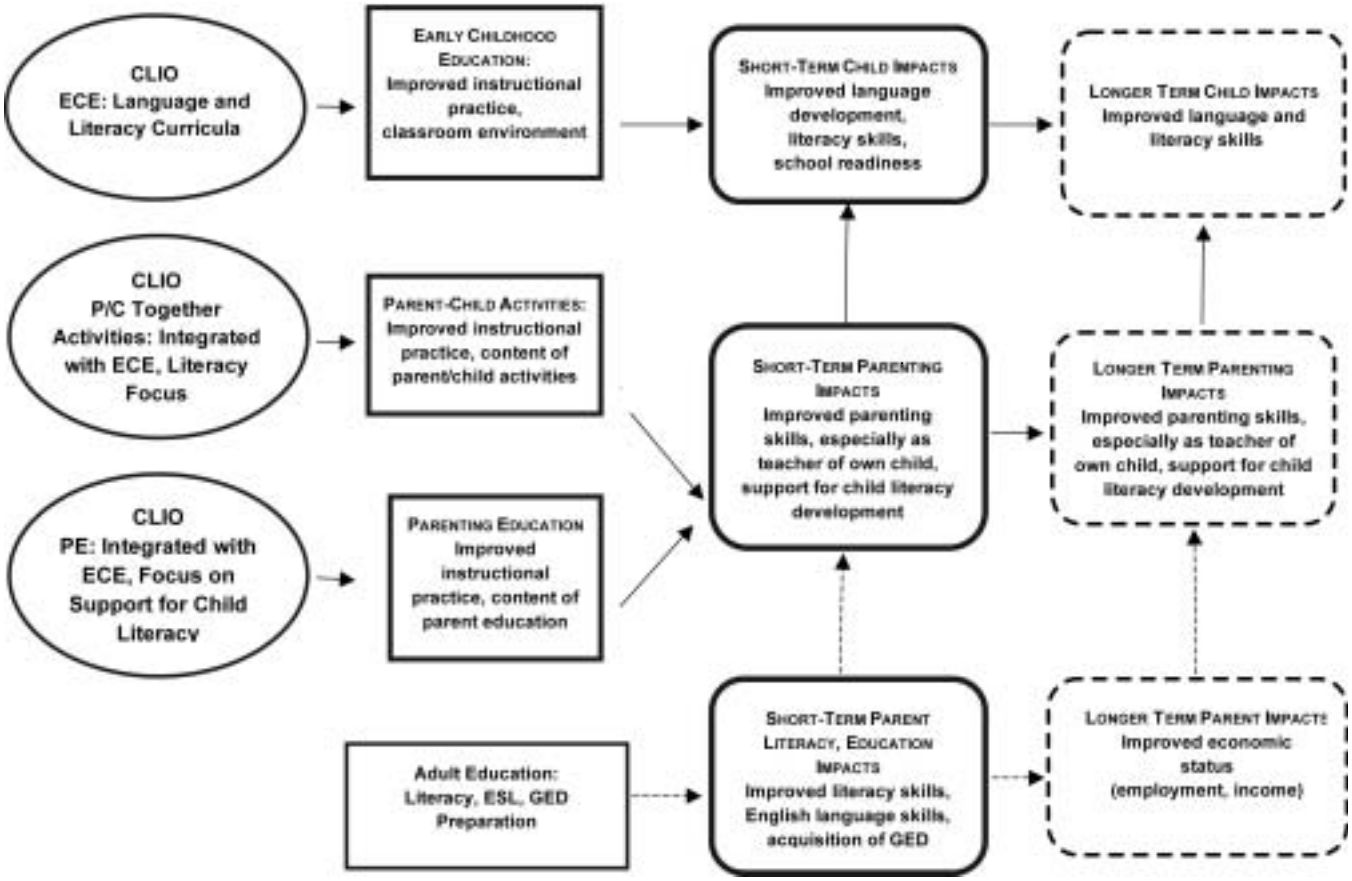
[5] Although Even Start serves families with at least one child between birth and age 8, and most projects serve children throughout this entire age range, the study focused on preschool-age children and their families. At the time the study was designed, the Even Start program office focused on school readiness by attempting to improve the effectiveness of educational services for 3- and 4-year-olds. CLIO did not include infants and toddlers because we felt that (1) there was no conclusive evidence that formal instruction in language and literacy is helpful for that age group, (2) there was an absence of systematic curricula for children in this age group, and (3) there was only limited information about how services for infants and toddlers were administered in Even Start. CLIO did not include school-age children since Even Start's role for school-age children is predominantly one of coordination with public schools. It was deemed unlikely that Even Start projects would be able to bring about curriculum changes in the public schools.

[6] The study team decided not to include Even Start's adult education component in the test of research-based curricula because (1) most projects provided a variety of adult education services at different levels (ABE, GED, ESL) to meet family needs, (2) a substantial portion of projects used community service providers to deliver adult education services, and (3) the research on effective adult education models is still in its infancy.

[7] Followup data collection with children in kindergarten and first grade is being conducted, and findings from that data collection will appear in a later report.

Figure 1-1. CLIO Model of Effects for Even Start Projects



Organization of the Report

In the remainder of this report we fully describe the research design (chapter 2), provide a description of the CLIO curricula (chapter 3), discuss the methods for the analyses (chapter 4), and present the findings of our analyses (chapters 5 through 7).

2. RESEARCH DESIGN

In this chapter, we describe the selection and implementation of the CLIO curricula, recruitment and random assignment, the CLIO projects at baseline, the data collection schedule and methods, the sample design, and the development of the outcome measures.

Selection of the CLIO Curriculum Developers

The hypothesis underlying the CLIO study is that an increased focus on literacy in preschool and parenting instruction would improve parent and child outcomes for Even Start families. To select interventions that were literacy focused and based on research, a public process was used in which developers of preschool and parenting curricula were invited to submit proposals for review by an expert panel. The Request for Proposals was prepared, and proposals were solicited in spring 2003 from curriculum developers. Eight proposals were received, and the authors of the four highest rated proposals were invited to make oral presentations to the expert panel. The expert panel rated the proposals on several key criteria, including the quality of the proposed intervention, capability of the institution to meet the requirements of the study and bring the interventions to scale, and staff qualifications and experience.

The key criterion (worth 55 of the 100 possible points) related to the quality of the proposed intervention. Under this criterion, the proposals were judged on the extent to which the content of the interventions (both preschool and parenting components) focused on literacy (specifically the domains of oral language, phonological awareness, print recognition and conventions of print), was appropriate for the Even Start population, and integrated the preschool and parenting components. The proposals were also judged on the evidence that the interventions were effective (particularly with populations similar to Even Start).

The selection was based primarily on the ratings of the intervention content, specifically whether the content proposed was linked—either by previous research or expert judgment—to the study's targeted outcomes. Although the four highest rated proposals thoroughly documented their curricula's grounding in the research literature on emergent literacy, rigorous evidence of effectiveness was not extensive. After the

oral presentation round of the selection process, the expert panel judged three of the four remaining proposals as acceptable for inclusion in the study. Two proposals were chosen from the three based on the strength of the parenting component of the intervention.

The two curriculum developers that were selected each has a preschool curriculum coupled with an integrated parenting curriculum. The developers were responsible for implementing their curricula in two modes: (1) preschool only, and (2) preschool and parenting combined. The curricula tested in CLIO were the following:

- **Let's Begin with the Letter People® and Play and Learning Strategies (PALS)—**The CIRCLE group at the University of Texas-Houston Health Sciences Center teamed with Abrams & Company Publishers to develop and implement:

  - (1) Preschool only: Let's Begin with the Letter People, a preschool curriculum that is built around 26 imaginary characters that represent the letters of the alphabet. Let's Begin was augmented with teacher training from CIRCLE on effective practices in early literacy.
  - (2) Preschool and parenting combined: Let's Begin was linked with the Play and Learning Strategies (PALS) parenting curriculum. PALS was developed by CIRCLE for parents whose children are at risk for developmental delay and academic failure due to poverty, low family literacy, and other risk factors and teaches parents to understand where their child is on the developmental continuum and what techniques they can use to build their children's language skills, cognitive development, and school readiness.

- **Partners for Literacy—**The University of North Carolina at Chapel Hill, Frank Porter Graham Child Development Center, developed and implemented:

  - (1) Preschool only: ECE Partners for Literacy, a preschool curriculum based on game-like activities and interactive book reading conducted with pairs of children and designed to promote language development and emergent literacy. The curriculum is based on an earlier version that was used in the Abecedarian project.

- (2) Preschool and parenting combined: ECE/PE Partners for Literacy, which links the preschool curriculum with an integrated parenting education curriculum that uses many of the same activities, strategies, and materials as the preschool curriculum.

Effectiveness and Appropriateness of Selected Curricula

Let's Begin and PALS. At the time of selection, Let's Begin had been implemented and field tested in preschool classrooms with populations similar to Even Start across the country. The developers cited the positive results of an ongoing efficacy study conducted by Abrams & Company, the curriculum publisher. The curriculum has take-home materials available in Spanish, and teacher materials contain suggestions for adapting activities for English language learners. PALS was developed for disadvantaged families and had been implemented in both English and Spanish. The developer cited positive results from a recent randomized controlled experimental study (Landry, Smith, and Swank 2003). Most PALS materials are available in both English and Spanish.

Partners for Literacy. Partners for Literacy materials were developed for children from low-income families and at the time of selection had been used in preschool settings with populations similar to Even Start. Developers cited positive results from three randomized, controlled longitudinal research studies: the Abecedarian Project (Ramey et al. 1976), project CARE (Wasik, Ramey, Bryant, and Sparling 1990), and the Infant Health and Development Program (Ramey et al. 1992). Professionals and parents received materials for cultural responsiveness, and all materials for parents are available in English and Spanish. Teacher training also included time and materials devoted to teaching English language learners.

Establishment of the Five Study Groups for the CLIO Study

One hundred twenty Even Start projects were recruited and randomly assigned to one of five study groups: one of the four CLIO curricula or an "as is" control group that provided their regular pre-CLIO instructional services (table 2-1). Even Start's four instructional components define the rows of the table, while the four CLIO

Table 2-1. Specification of the Five CLIO Study Groups

Even Start instructional component	Study group				
	LET'S BEGIN with the Letter People (ECE) CLIO preschool curriculum	LET'S BEGIN with the Letter People and Play and Learning Strategies (PALS)(ECE/PE) CLIO combined curriculum	Partners for Literacy (ECE) CLIO preschool curriculum	Partners for Literacy (ECE/PE) CLIO combined curriculum	Control
Early childhood education	LET'S BEGIN	LET'S BEGIN	Partners for Literacy	Partners for Literacy	As usual
Parenting education	As usual	PALS	As usual	Partners for Literacy	As usual
Parent-child joint literacy activities	As usual	PALS	As usual	Partners for Literacy	As usual
Adult education	As usual	As usual	As usual	As usual	As usual

NOTE: Shaded areas identify instructional components that were provided by the CLIO curriculum developers.

experimental groups and a control group define the columns. Shaded table cells identify instructional components that were provided by the CLIO curriculum developers. The CLIO study groups have the following characteristics:

- Study Group 1: Even Start projects were assigned the Let's Begin preschool curriculum. These projects provided their usual PE, PC, and AE instructional services.
- Study Group 2: Even Start projects were assigned both the Let's Begin preschool curriculum and the PALS parenting curriculum. These projects provided their usual AE instructional services.
- Study Group 3: Even Start projects were assigned the Partners for Literacy preschool curriculum. These projects provided their usual PE, PC, and AE instructional services.
- Study Group 4: Even Start projects were assigned both the Partners for Literacy preschool curriculum and the parenting curriculum. These projects provided their usual AE instructional services.

- Study Group 5: Even Start projects assigned to the control group provided each of the four instructional components as usual. This was an "as is" or "business as usual" control group.

Implementation of the Curricula

Once selected, the curriculum developers modified their existing curricula as appropriate, developed materials, prepared professional development and implementation plans, and piloted their curricula with a small number of Even Start projects in 2003-2004. Curricula were revised on the basis of the pilot test, and plans were made for large-scale implementation. In summer 2004, a 4-day centralized training session was held for each curriculum, attended by project directors and teachers from the assigned Even Start projects. In addition, the curriculum developers provided each participating Even Start project with on-going support and technical assistance over the life of the study.

Implementation of the CLIO curricula in Even Start classrooms began in the 2004-2005 school year, and during that year, ongoing support was provided to each project through telephone calls and on-site visits. In summer 2005, a second centralized training was held to retrain Even Start staff who had been trained in the previous summer and to provide an initial training to new staff members. Each of the four CLIO curricula was then implemented for a second year during 2005-2006, again with ongoing support of the curriculum developers. The implementation phase of CLIO concluded at the end of the 2005-2006 school year.

Design of the Study to Address the Research Questions

The CLIO study was designed to address two primary research questions:

- **Research Question 1:** Is the combination of research-based, literacy-focused preschool, parenting, and parent-child curricula (the CLIO combined curricula) more effective than the existing combination of services in Even Start?

- **Research Question 2:** Do research-based parenting and parent-child curricula (the CLIO parenting curricula) that focus on child literacy add value to the CLIO preschool curricula?

The first question was addressed analytically by combining projects in the second and fourth columns of table 2-1 (those assigned to the CLIO combined curricula), and comparing their outcomes with those of control projects (the fifth column). The second question was addressed analytically by combining projects in the second and fourth columns of table 2-1, and comparing their outcomes with those of projects in the first and third columns (those assigned to the CLIO preschool curricula).

In addition to these two primary research questions, the CLIO study examined several secondary questions:

- *Instructional Practices:* To what extent are particular preschool instructional practices associated with better child outcomes?
- *Parenting Practices:* To what extent are parenting practices associated with better child outcomes?
- *Fidelity of Implementation:* How much variation was there in the faithfulness with which CLIO projects implemented the assigned curricula? Were child and parenting outcomes better in projects with higher fidelity to their assigned curriculum?
- *Participation:* To what extent is participation associated with better outcomes?

Recruitment of Even Start Projects

Recruitment of Even Start projects for the CLIO study began with a careful screening of projects to determine which ones met the study's eligibility requirements. To be eligible for CLIO, an Even Start project had to

1. serve preschool children in a center-based instructional setting,
2. enroll a minimum of either five 3- and 4-year-olds in one center-based classroom, or eight 3- and 4-year-olds in two center-based classrooms,

3. provide at least 12 hours per week of center-based preschool instruction,

4. serve a majority of families who speak either English or Spanish,

5. be able to exert control over the curricula used in preschool classrooms, and

6. be willing to meet the study requirements, including being randomly assigned to one of the five study groups.

Exerting control over preschool curricula was an eligibility criterion because Even Start requires projects to build on existing services, where possible, to avoid duplication. Thus, many projects do not directly provide all of Even Start's instructional services, but rather, coordinate with other programs to provide some services. For example, during the latest national evaluation (St.Pierre, Ricciuti, and Rimdzius 2003), 22 percent of Even Start 3- and 4-year-olds who participated in center-based ECE received these services from Head Start programs. Projects that outsourced their instructional services in this way were not excluded from participating in CLIO, but few chose to do so, since the Even Start grantee often did not have control over the preschool curriculum. Hence, most CLIO projects were ones that provided their own preschool instruction. The study team did not, however, screen for eligibility based on (1) serving children and their parents in a center-based setting for the provision of parent-child activities or parenting education or (2) providing a specified number of hours per week of parent-child activities or parenting education instruction.

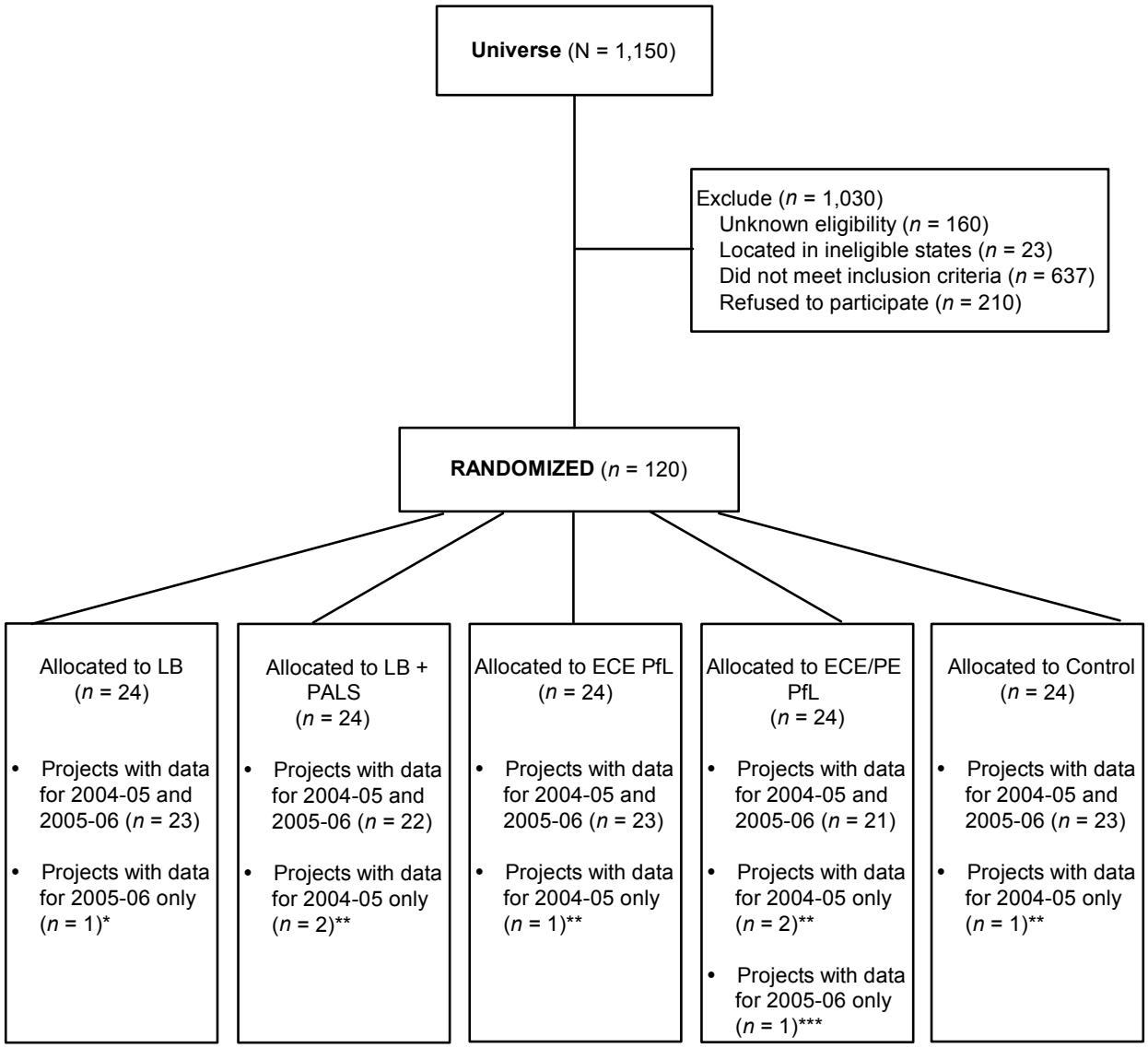
In spring 2003, 1,150 Even Start projects operated throughout the United States. Telephone calls were attempted with 1,127 of these projects, excluding 23 projects in Alaska, Hawaii, and Puerto Rico that were defined as ineligible due to the distances and prohibitive costs that would be associated with data collection. Telephone surveys were completed with 967 (86 percent) of the 1,127 Even Start projects in eligible states. Of these, 637 were ineligible to participate in the study for reasons such as not serving a sufficient number of preschool-age children, not offering preschool-age children at least 12 hours per week of center-based preschool instruction, serving primarily families that spoke languages other than English or Spanish, or not having a center-based ECE program.

During the screening process, we relaxed the requirements to broaden the eligibility pool by allowing (1) the enrollment of fewer numbers of children in center-based classrooms and (2) the provision of at least 10 hours (lowered from 12) of center-based preschool instruction. At the conclusion of the screening process, 330 Even Start projects were deemed eligible.

Of the eligible projects, 120 were willing to participate in the study and were randomly assigned to one of the five study groups. (See figure 2-1 for the flow of the projects through the recruitment process.)

CLIO was designed and implemented as a real-world study of literacy focused, research-based curricula in Even Start settings. Nationwide, Even Start settings vary widely on every aspect of the program. Even Start projects are mandated to offer instructional services that include early childhood education, adult literacy education, parenting education, and structured literacy interaction between parents and their children. They also are required to avoid duplication of services by building on existing community resources such as local adult education programs or Head Start. Even Start projects decide on the frequency and duration of instruction, whether instruction is primarily center-based or home-based, and whether to invent educational curricula from scratch, use published curricula, or use a hybrid of approaches. Based on the availability of local instructional services and the extent to which those services are perceived to be of high quality, project staff decide which activities will be supported by Even Start funds and which will be provided by collaborating agencies. Projects offer screening and referral services such as referrals for mental health counseling, services to battered family members, employment services, and screening or treatment for chemical dependency. Projects also offer support services such as transportation, flexible scheduling, childcare, nutrition assistance, health care, and meals to help families participate in the program. The CLIO curricula were implemented in a sample of 120 Even Start projects that were spread over 33 states and reflected this diversity. As a result, CLIO could not be a tightly controlled laboratory-type experiment.

Figure 2-1. Flow of Even Start Projects Through CLIO Recruitment and Randomization



NOTE:
All groups had 24 projects providing at least 1 year of data for the combined spring 2005 and spring 2006 analysis.
*One of the original 120 projects dropped out of the study prior to the first implementation year (2004-2005) and was replaced for 2005-06.
**Six projects lost funding for the second implementation year (2005-2006) and had data for 2004-2005 only.
***One project lost funding prior to the first implementation year (2004-2005) and was replaced for 2005-2006.

Random Assignment of CLIO Projects

The CLIO random assignment plan focused on ways to minimize pre-existing differences among the five study groups. Before random assignment, 24 strata were formed, each containing exactly five projects. The variables used to form the strata were (1) size of project (number of 3- and 4-year-olds served), (2) proportion of children who were Spanish speakers, (3) year that the project was up for recompetition, and (4) region. (See table 2-2 for the cut points for each of these stratification variables.)[8]

Table 2-2. Stratification Variables Used in Random Assignment

Stratification variables	Categories
Size of project	3 categories: • large, defined as more than 28 3- and 4-year-olds • medium, defined as 10 through 28 3- and 4-year-olds • small, defined as 9 or fewer 3- and 4-year-olds
Proportion of Spanish-speaking children	3 categories: • very large, defined as more than 25 percent Spanish speakers • medium, defined as 8 percent through 25 percent Spanish speakers • small, defined as less than 8 percent Spanish speakers
Last year of current grant	3 categories: • 2003-2004 school year • 2004-2005 school year • other
Region	4 standard Census categories

The highest priority was placed on size of project. The large category contained only 13 projects. Among these, we generally found either a very large proportion or a very small proportion of Spanish speakers, so within it we created just two strata, substratified only on percentage Spanish while ignoring the other two variables. The other three large projects were then mixed in with the medium projects.

[8] Simply crossing these four variables would have created 108 strata, more than could be used. Accordingly, extensive collapsing of preliminary strata was required. Because of the requirements of exactly five projects per stratum, we also sometimes had to make small changes in the thresholds.

Within the medium and small categories, we were able to use more categories of percentage Spanish and to pay some attention to the other variables. Once the 24 strata were finalized, the five projects in each were randomly assigned to the five study groups in early 2004.

A comparison of the resulting five groups of projects (mostly in terms of variables collected at the spring 2004 baseline) showed that the random assignment plan resulted in well-matched study groups. There were no statistically significant differences among the five groups on 55 of 58 spring 2004 variables that were examined (see tables A-1 through A-5 in appendix A).[9] Additionally, there were no statistically significant differences among the five groups on 23 of the 25 variables examined in spring 2005 and spring 2006 (see table A-1)[10]

Study Projects at Baseline

The voluntary nature of participation and the eligibility criteria for the study meant that the CLIO sample was not nationally representative of Even Start projects. However, the 120 recruited projects were located in 33 states in all regions of the country and varied on characteristics such as population density, number of families served, percentage of families who are English language learners, and number of years as Even Start projects. In this section, we present descriptive statistics on the study sample, both to set a context for the evaluation and to provide a basis for assessing the study's external validity.

Race/Ethnicity. In spring 2004, prior to implementation of the CLIO curricula, 57 percent of CLIO children were identified as Hispanic. In 2000-2001 (the most recent period with national data), 46 percent of Even Start parents nationally were Hispanic (table 2-3). Although the CLIO sample is not nationally representative, the

[9] Two of these three variables were included among the covariates chosen for the impact analysis. See chapter 4 for a full list of covariates.

[10] Two types of tests were used for testing for baseline balance across the study groups. For baseline item response theory (IRT) scores, hierarchical linear modeling (HLM) was used with a two-level setup (project and child) and no covariates other than strata. For all other types of variables, a stratum-adjusted Kruskal-Wallis test was run on project-level averages. No weights were used at the project level. Multinomial variables like race were transformed into a series of binary recodes, each of which was tested separately.

movement from 46 percent to 57 percent continues a long trend of increases in the percentage of Hispanic families served by Even Start.

Table 2-3. Percentage Distribution of CLIO Children and Even Start Parents by Race/Ethnicity

	CLIO children spring 2004	Even Start parents 2000-01
Race/ethnicity		
White	22	30
Black	11	19
Hispanic	57	46
Other	9	5

NOTE: Detail may not sum to totals due to rounding.
SOURCES: U.S. Department of Education, Even Start Classroom Literacy Interventions and Outcomes Study, "Parent Interview," Spring 2004; U.S. Department of Education, Planning and Evaluation Service, Elementary and Secondary Education Division, *Third National Even Start Evaluation: Program Impacts and Implications for Improvement*, Washington, DC: 2003.

Maternal Education. As of spring 2004, 38 percent of CLIO children had mothers with a high school diploma, GED, or higher (table 2-4). In 2000-2001, 15 percent of new Even Start parents had this level of education. Additionally, in 2003-2004, 24 percent of new Even Start participants had a high school diploma, GED, or higher. The national statistics are based on parents from newly entering Even Start families, whereas the CLIO statistic is based on information about mothers from all Even Start families in each project, some of whom many have increased their education attainment as a result of participating in Even Start. Since prior research has shown that Even Start has a positive impact on GED attainment, it is not surprising that education attainment based on all families in the program, including those that have participated for many months, would be different from educational attainment based only on newly entering families. Of course, there may be other reasons as well for the high educational attainment of CLIO mothers relative to national Even Start figures.

Hours of Instruction. Amount of instruction offered and received is a statistic that was calculated in prior Even Start studies. The CLIO projects are similar to the 2000-2001 national sample in terms of participation in PE and PC activities. CLIO parents participated in PE and PC activities for an average of 10 hours a month in

Table 2-4. Percentage Distribution of Educational Attainment for Mothers of CLIO Children and New Even Start Parents

	Mothers of CLIO children spring 2004	New Even Start parents 2000-2001	New Even Start parents 2003-2004
Educational attainment			
HS, GED, or higher	38	15	24
Without HS/GED	62	84	76

NOTE: Detail may not sum to totals due to rounding.
SOURCES: U.S. Department of Education, Even Start Classroom Literacy Interventions and Outcomes Study, "Parent Interview," Spring 2004; U.S. Department of Education, Planning and Evaluation Service, Elementary and Secondary Education Division, *Third National Even Start Evaluation: Program Impacts and Implications for Improvement*, Washington, DC: 2003; U.S. Department of Education, Consolidated State Performance Report School Year 2004-05.

2003-2004, similar to the 2000-2001 national estimate of 11 hours a month (table 2-5). In 2003-2004, projects in the CLIO study offered preschool-age children an average of 84 hours of instruction each month, fairly similar to the national statistic of 76 hours a month in 2000-2001 (table 2-5). Children in the CLIO sample participated in preschool instruction an average of 42 hours a month during 2003-2004. Although this was only half of the amount offered to them, it nevertheless is greater than the national Even Start average of 33 hours a month of participation in preschool education in 2000-2001 (table 2-5).

Teacher Education. In spring 2004, 82 percent of the lead preschool teachers, 22 percent of the preschool aides, and 89 percent of the lead PE teachers in the CLIO sample had an associate's degree or higher (table 2-6).

Classroom Instruction. At baseline most CLIO projects (71 percent) reported that they used at least one formal curriculum in their preschool classrooms. These projects cited a wide range of instructional programming, including published comprehensive curricula, literacy-focused supplemental curricula, state curriculum frameworks, skills assessments linked to instructional strategies, informal non-published curricula, and local or other reading initiatives. Of the projects that used a formal curriculum, close to 70 percent reported using either High Scope or Creative Curriculum. About half (55 percent) reported that they used at least one formal curriculum for their parenting education sessions. Of those, about 40 percent used Parents as Teachers. Most projects (78 percent) reported that they did not use any formal curriculum in their parent-child interactive sessions.

Table 2-5. Average Monthly Hours of ECE Instruction Offered and Received and Average Monthly Hours of PE/PC Instruction Received, for CLIO and Even Start

	CLIO 2003-2004	Even Start 2000-2001
Projects[1]		
Hours of ECE instruction offered per month	84	76
Children[1]		
Hours of ECE instruction received per month	42	33
Parents		
Hours of parenting education and parent-child joint activities received per month	10	11

[1] Even Start hours for 2000-2001 represent instruction for 3- and 4-year-olds.

SOURCES: U.S. Department of Education, Even Start Classroom Literacy Interventions and Outcomes Study, "Instructional Services Participation Form, and Project Director Survey," Spring 2004; U.S. Department of Education, Planning and Evaluation Service, Elementary and Secondary Education Division, *Third National Even Start Evaluation: Program Impacts and Implications for Improvement*, Washington, DC: 2003

Table 2-6. Educational Attainment of Even Start Staff in CLIO Projects: Spring 2004

Staff position	Percent
Lead preschool teacher	
Educational attainment	
Less than associate's degree	18
Associate's degree or higher	82
Preschool aide	
Educational attainment	
Less than associate's degree	78
Associate's degree or higher	22
Lead PE teacher	
Educational attainment	
Less than associate's degree	11
Associate's degree or higher	89

SOURCE: U.S. Department of Education, Even Start Classroom Literacy Curricula and Outcomes Study, "Staff Survey," Spring 2004.

At baseline, all CLIO projects were observed with the Early Childhood Environment Scale-Revised Edition (ECERS-R; Harms, Clifford, and Cryer 1998) to assess the quality of the classroom environment, including use of space, materials and experiences to enhance children's development, schedule, and supervision. Specifically, the ECERS-R assesses 37 items that cover the six classroom areas: space and furnishings; personal care routines; oral language and reasoning skills; fine motor, gross motor, and creative activities; interactions among children and between children and staff; and program time and structure. Each item is ranked on a scale of 1 (inadequate conditions) to 7 (excellent conditions), with 3 representing minimal conditions and 5 representing good conditions.

Across the 37 items, CLIO projects scored an average of 4.88 on the ECERS-R measure, suggesting that, on average, CLIO projects have good classroom environments. No project received an "inadequate conditions" rating. Approximately 70 percent of projects received a rating of 4 or 5. These data suggest that CLIO classrooms are comparable to Head Start preschool classrooms. According to the Head Start Family and Child Experiences Surveys (FACES), the average overall ECERS-R score for Head Start classrooms was 4.91 in spring 2001 and 4.81 in fall 2003 (U.S. Department of Health and Human Services 2006).

Even Start Continues to Work With a Needy Population. The data presented in this section show that Even Start families in the CLIO sample continue to face many of the same difficulties that were identified in the Third National Even Start Evaluation (St.Pierre et al. 2003). Income and education levels are low compared to most of America: 58 percent of Even Start families in the CLIO projects have monthly income below $1,500, and only 38 percent of Even Start mothers in the CLIO projects have a high school diploma. Furthermore, adult English fluency is poor. In spring 2004, 59 percent of CLIO parents report a native language other than English. Among the non-native speakers, just 7 percent claim to speak and understand English very well (compared to 88 percent of the native speakers). Literacy is also poor. Overall, just 40 percent of CLIO parents claim to read English very well. These self-reports of low fluency and literacy are borne out by the assessments. In particular, Even Start parents in the CLIO projects scored quite low on the Peabody Picture Vocabulary Test (PPVT)—70 on average using publisher norm scores with a national mean of 100 and a national standard deviation of 15.

Given the unexpectedly large number of CLIO mothers with a high school diploma, GED, or higher educational attainment (relative to the most recent available national Even Start figures), we also looked at the breakdown of published PPVT scores by mother's education. We found that even among mothers with higher educational attainment, receptive vocabulary scores were very low: mothers who attended some college had an average PPVT score of 84, those with a high school diploma averaged 77, and those without a high school diploma averaged 63.

Data Collection Schedule and Methods

In this section, we discuss the CLIO study's data collection schedule and provide an overview of the data collected by data collection cycle (see table 2-7).

The CLIO study's data collection schedule was as follows:

- **2003-2004: baseline year.** We collected baseline data on 3- and 4-year-olds and their parents in all Even Start projects participating in the CLIO study during the 2003-2004 project year. We also observed classroom instruction and collected information about the project in the spring of the baseline year.

- **2004-2005: first year of implementation.** We collected data on 3- and 4-year-olds and their parents in all Even Start projects participating in the CLIO study during the 2004-2005 project year. We also observed classroom instruction and collected information about the project in the spring of the first implementation year.

- **2005-2006: second year of implementation.** We collected data on 3- and 4-year-olds and their parents in all Even Start projects participating in the CLIO study during the 2005-2006 school year. We also observed classroom instruction and collected information about the project in the spring of the second implementation year.

Data were collected from (1) preschoolers (3- and 4-year-olds), (2) their parents, (3) classrooms, and (4) projects. Here we briefly describe the types of data collected and the methods for collecting these data. In the next section, we discuss the creation of outcome measures based on these data.

Table 2-7. Overview of Data Collection

	Data collection instrument	Baseline year		First implementation year		Second implementation year
		Fall 2003	Spring 2004	Fall 2004	Spring 2005	Spring 2006
Preschoolers						
Assessment	Child Assessment Battery	X	X	X	X	X
Social-emotional	Teacher–Child Rating Form	X	X	X	X	X
Videotape	Read Aloud Together Profile			X	X	X
Participation	Instructional Services Participation Form	X	X	X	X	X
Parents						
Assessment	Parent Assessment Battery	X	X	X	X	X
Interview	Parent Interview	X	X	X	X	X
Videotape	Read Aloud Together Profile			X	X	X
Participation	Instructional Services Participation Form	X	X	X	X	X
Classrooms						
Observation of instruction	Observation Protocols		X		X	X
Observation of fidelity	Observation Protocols				X	X
Survey	Teacher Survey		X		X	X
Projects						
Survey	Project Director Survey		X		X	X

Data Collected From Preschoolers

At each data collection cycle, trained field staff administered a battery of one-on-one child assessments. The battery covered the following domains: a test of expressive language, in both English and Spanish; a test of receptive vocabulary; two tests of phonological awareness, Elision and Blending; a test of print knowledge; and a test of syntax and grammar. These assessments are described in detail later in this chapter (see section entitled child outcomes). The study team conducted a week-long training prior to each data collection cycle to prepare field staff for data collection.

Assessments were conducted at each Even Start project, in a setting provided by the Even Start project staff.

Each preschooler's teacher was asked to complete a Teacher-Child Rating (TCR) form at each data collection cycle. The TCR captured information on each child's behavior and social skills. More information about the TCR is provided later in this chapter (see section entitled child outcomes). The trained field staff distributed and collected the TCRs while on-site.

Another aspect of the data collection was the videotaping of each preschooler and parent during the three data collection cycles in the two implementation years. Trained field staff videotaped the parent and child engaged in a book reading activity and in playing with a toy. Both the book and the toy were supplied by the field staff, who were trained in videotaping during a week-long training and given a script to follow. The videotaping took place at each Even Start project, in a setting provided by the Even Start project staff. More details on the videotaping can be found later in the chapter (see section entitled Parent Outcomes).

Finally, each preschooler's hours of participation in preschool education in the Even Start project was collected from Even Start project staff using a template developed for the CLIO study referred to as the Instructional Services Participation Form and described later in the chapter (see section entitled Instructional Outcomes). Projects submitted the participation information to the study team monthly.

Data Collected From Parents

At each data collection cycle, trained staff administered a battery of one-on-one parent assessments as well as a parent interview. The battery covered receptive vocabulary, basic reading skills, and comprehension. More detail on the assessments is provided later in the chapter (see section entitled Parent Outcomes). The interview collected parents' self-reported information about their reading and language activities with their child, the home literacy environment, their ratings of their child's behavior and social skills, and parent demographics. The study team conducted a week-long training prior to each data collection cycle to prepare field staff for data collection. (The same field staff conducted the child assessment, the parent assessments, the parent

interviews, and the videotaping.) Assessments and interviews were conducted at each Even Start project, in a setting provided by the Even Start project staff.

The videotaping is discussed above under data collected from preschoolers.

Finally, each parent's hours of participation in parenting education and parent-child activities in the Even Start project were collected from Even Start project staff using a template developed for the CLIO study referred to as the Instructional Services Participation Form and described later in the chapter (see section on Instructional Outcomes). Projects submitted the participation information to the study team monthly.

Data Collected From Classrooms

In the spring of each year, preschool education classes, parenting education classes, and parent-child activities classes were observed by trained staff. The study team provided extensive training in the use of the observation measures. There were two sets of staff for the observations, each trained separately: one set for the preschool classes, and one set for the parenting and parent-child classes. The observation protocols were designed to collect information on instructional practices in the classrooms and on the fidelity of implementation to the CLIO curricula. Observation of instructional practices is described in detail later in this chapter (see section on Instructional Outcomes), and observation for fidelity of implementation is discussed in chapter 4.

Each spring, teachers were asked to complete a short survey to provide information on their educational background, demographics, and professional development opportunities. The observers distributed and collected the teacher surveys while on-site to conduct the classroom observations.

Data Collected From Projects

Each Even Start project director was administered a survey to collect information regarding services in each of the four Even Start components, including numbers of families and children served, hours offered, and curricula used. Project directors were also asked to provide information on their educational background,

demographics, and professional development opportunities. The project director survey was conducted as a mail survey.

Sample Sizes

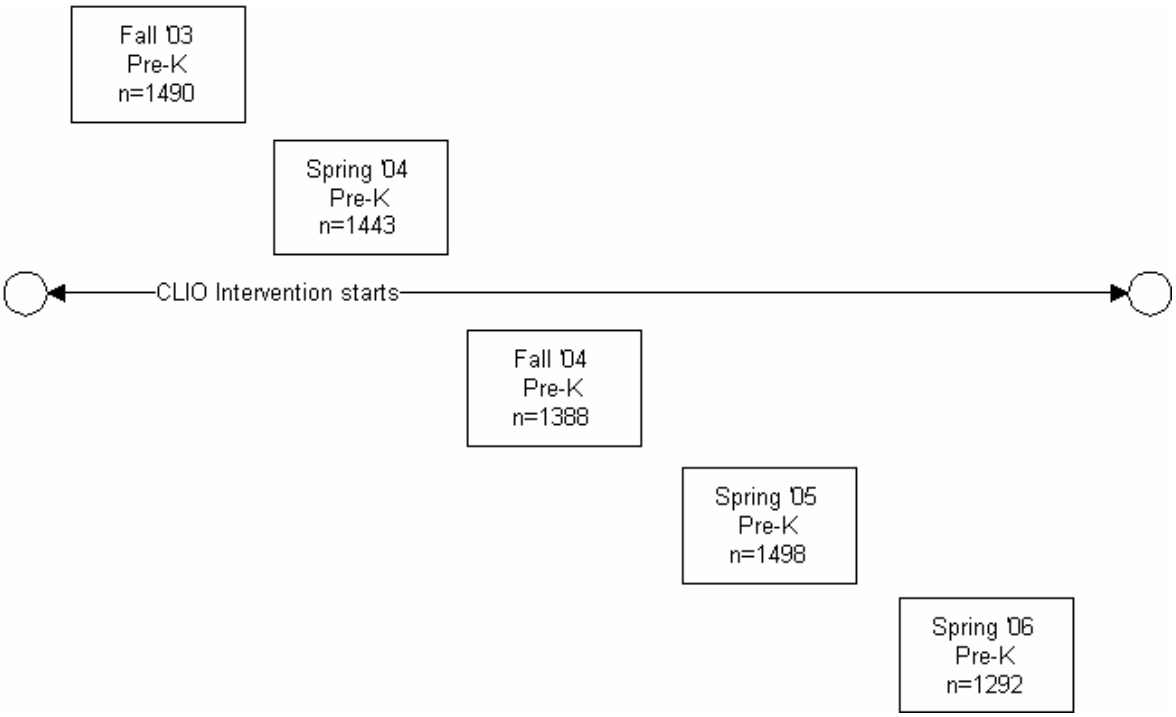
Children enrolled at CLIO projects were generally eligible for participation in the CLIO study if they were between 36 and 60 months of age at the time of assessment and were not yet attending kindergarten.[11] Children whose attendance at CLIO centers overlapped multiple data collection periods were assessed multiple times, but there was no effort to make the sample longitudinal. Sample sizes for analysis purposes are shown in figure 2-2 and table 2-8.

Development of Outcome Measures

The CLIO study collected a large amount of information in many different outcome domains to fully address the study's research questions. There are three broad measurement categories: (1) child outcomes, (2) parent outcomes, and (3) instructional outcomes. (Table 2-9 shows the outcome measures and the constructs they were selected to measure.) Child and parent outcomes align directly with the primary CLIO research goals of improving child language and literacy and parenting practices. While the instructional outcomes can be viewed as either mediating variables or as outcomes in their own right, the principal analysis for this study treated the instructional process variables as outcomes. However, secondary analyses were run with non-experimental techniques to explore the relationships between instructional process variables and child and parent outcomes.

[11] For spring data collection (2004, 2005, and 2006), the child must have turned 3 no later than March 1. For fall data collection (2003 and 2004), the child must have turned 3 no later than October 1. In spring 2006, children who had been assessed in spring 2005 and who were old enough to be in kindergarten were not included in the preschool sample, whether or not they were still in preschool. This change was made so that these children could participate in the follow-up data collection with the instruments designed for kindergarten students.

Figure 2-2. CLIO Cross-Sectional Sample Sizes



NOTE: Figure counts are limited to children who took at least one of the child assessments and were enrolled at a project for at least 28 days as of the assessment date.

Table 2-8. Cross-sectional Child Sample Size by Child Age and Data Collection Cycle

Child age at assessment	Baseline		CLIO curricula in implementation		
	Fall 2003	Spring 2004	Fall 2004	Spring 2005	Spring 2006
3	574	367	571	400	353
4	726	658	685	683	603
5	190	412	130	413	335
6	0	6	2	2	1
Total	1,490	1,443	1,388	1,498	1,292

NOTE: Counts are limited to children who took at least one of the child assessments and were enrolled at a project for at least 28 days as of the assessment date.

Table 2-9. CLIO Outcome Measures

	Outcome		Data collection instrument	Mode of data collection	Domain
CHILD	1	Expressive language: English	Individual Growth and Development Indicator (IGDI)	Child assessment	Emergent literacy
	2	Expressive language: Spanish			
	3	Receptive vocabulary	Peabody Picture Vocabulary Test (PPVT)		
	4	Phonological awareness: Elision	Comprehensive Test of Phonological and Print Processing (Preschool—CTOPPP)		
	5	Phonological awareness: Blending			
	6	Print knowledge			
	7	Syntax and grammar	Test of Language Development (TOLD-3)		
	8	Social competence	Teacher rating form	Teacher rating	Socio-emotional development
PARENT	9	Parent interactive reading skill	Read Aloud Together Profile & Parent Interview	Video observation, parent report	Parenting skills
	10	Parent responsiveness			
	11	Reading & vocabulary skill	Parent assessment battery	Parent assessment	Parent language & literacy
INSTRUCTIONAL	12	Support for oral language development	Observation Measures of Language and Literacy Instruction (OMLIT) and Parenting Education and Child/Parent Observation (PECAP)	Classroom observation	ECE classroom instruction
	13	Support for print knowledge			
	14	Support for phonological awareness			
	15	Support for print motivation			
	16	Literacy resources in classroom			
	17	PE time spent on child literacy			PE classroom instruction
	18	PE time spent on parenting skills			
	19	PC time spent interacting on child literacy activities			PC classroom instruction
	20	Child: Monthly hours of ECE instruction received	Instructional Services Participation Form (ISPF)	Project report	Participation amount
	21	Parent: Monthly hours of PE and PC instruction received			

A key consideration in creating outcome measures was the total number to construct. The experimental curricula were expected to possibly affect a broad range of child, parent, and instructional outcomes. This argued for a large number of outcome measures. However, false positive findings can be caused by running a large number of statistical tests. This argued for being parsimonious in selecting outcome measures. A target of about 20 outcomes was set so that the expected number of false positive

findings in the event of no true effects would not be more than one. Multiple comparison adjustments were used for the variety of contrasts of interest pertinent to each outcome, but these adjustments were not applied across outcomes, as to do so would have lowered statistical power too precipitously.

Multiple literacy subtests, targeting different aspects of literacy, were used for both parents and children. The literacy subtests were averaged together for parents but left separate for children. In both cases, there are substantial correlations among the tests, but given that the CLIO curricula do not systematically vary adult literacy education, parent subtests were averaged to reduce multiple comparison problems. The children's subtests were kept separate partly because of the different theory behind each subtest and partly to facilitate subsequent meta-analyses since other studies tend to report them separately.

Child Outcomes

Even Start projects provide ECE to children in low-income families to prepare them for success in school. Hence, the CLIO curricula were selected, in large part, for the strength of their preschool curricula, in particular the language and literacy dimensions. The CLIO child assessment battery was designed to measure early language and literacy development, including vocabulary, phonological awareness, and print knowledge. Research has shown these areas are important in the development of reading skills and predictive of school achievement (National Research Council 2001).

On each of the child outcome tests (except the IGDI and Spanish IGDI), multiple scoring procedures were applied, including a simple count of items correct as well as complex scoring similar to what is done in the National Assessment of Educational Progress (NAEP), the Early Childhood Longitudinal Study – Birth Cohort (ECLS-B), and several other large-scale testing programs. (Appendix B provides descriptions of the two scoring procedures.) Where the complex scoring was carried out, the scores were scaled to have a mean of 250 and a standard deviation of 50. The raw scores were left on the metric represented by the number of items asked. For all contrasts between study groups, treatment effects are expressed in terms of standard deviations within the control group.

Below we describe each of the outcome measures. See appendix B for psychometric data for each test.

Expressive Language. The IGDI Picture Naming subtest (Early Childhood Research Institute on Measuring Growth and Development 2003) measures expressive language by asking the child to recognize and name a series of common objects in English using picture cards. Following the test publisher's standard procedure, the assessor counted the number of cards the child named correctly in 1 minute, but did not track which cards the child failed to name correctly. The protocol called for the subtest to be administered to all children regardless of native language. A parallel subtest, the Spanish IGDI, was administered in Spanish to children from Spanish-speaking families.

Receptive Vocabulary. The Peabody Picture Vocabulary Test (PPVT-III) measures receptive vocabulary (Dunn and Dunn 1997) and has been widely used in other early childhood studies. In this subtest, the child demonstrates his or her understanding of the meaning of an English word by pointing to the correct picture. CLIO used a version of this test that was adapted by Westat for this study. This adapted version contained fewer items, and the words were divided into three sets. In the first set for every child, there were 14 words. If the child made fewer than three errors in the first set, then he/she was given an additional set (the ceiling set) of 10 more difficult words. At the other extreme, if the child made more than seven errors in the first set, then he/she was given an additional set (the basal set) of eight easier words.

Phonological Awareness: Elision. The Preschool CTOPPP (Lonigan, Wagner, Torgesen, and Rashotte 2002) was developed to measure phonological awareness in English in younger children. The Elision subtest measures the child's ability to recognize English word parts, such as components of compound words, syllables, and phonemes. The examiner reads a compound word and the child is asked to identify what is left when part of the word is taken away. The part taken away can be a whole word from a compound word (e.g., "toothbrush without brush") or phoneme (e.g., team without /m/). There were 18 items in this subtest. For the first nine items, the child identified what was left by pointing at a picture of it on a page with four pictures. For the last nine items, the child was asked to verbalize the remainder without visual aids. The first nine items were given to each child regardless of the child's error rate. After the first nine items, a run of three consecutive errors caused the subtest to be stopped.

Phonological Awareness: Blending. The blending subtest of the Preschool CTOPPP measures the child's ability to combine English word parts, such as components of compound words, syllables, and phonemes. The examiner says two parts of an English word and asks the child to put them together (e.g., "horse and shoe together is horseshoe"). There were 21 items in this subtest. In the first nine items, the child was asked to identify compound words by pointing at the answer from a page with four choices. The child went through all nine items regardless of the number of errors. For the final 12 items, the picture support was not available, and there was a skip-out rule tied to three consecutive errors.

Print Knowledge. The Print Awareness subtest of the Preschool CTOPPP assesses the child's ability to identify Roman alphabet symbols that represent letters and words used in English, to identify specific letters by name and by sound, and to produce letter sounds. On this subtest, there was no stopping rule. All children were asked all items.

CLIO used a research version of the Preschool CTOPPP available in the study's first data collection year (2003-2004). However, a slightly revised version of the test with normed scores has since been published by ProEd as the Test of Preschool Early Literacy (TOPEL). The TOPEL Phonological Awareness test combines the CTOPPP Elision and Blending subtests, contains fewer items, and uses different stopping rules. The TOPEL Print Knowledge test contains the same items as the CTOPPP Print Awareness subtest, but administers the items in a different order with different administration rules.

Syntax and Grammar. The TOLD-3 Grammatic Understanding subtest (Newcomer and Hammill 1997a; 1997b) measures the child's ability to comprehend the meaning of an English sentence, with an emphasis on syntax and morphology. Knowledge of syntax is important in constructing and understanding sentences. In this subtest, the assessor read a sentence aloud, and the child was asked to select one picture from three possible choices that correctly corresponded to the sentence. There were 24 items in this subtest. Six consecutive errors caused the subtest to be stopped.

Child Social Competence. Developing children's social competence is an important objective for early childhood programs, and the development of social skills and positive behaviors is associated with success in school. Positive behavior includes

cooperation with adults, friendly play, and sharing with other children. Problem behaviors include disruptive or overly aggressive behavior, hyperactivity, excessive shyness and social withdrawal. These negative behaviors are associated with problems in school and/or receipt of psychological help (Gresham and Elliott 1990).

A social competence scale was created from preschool teacher reports on the behavior and social skills of children in the study. The scale combines information from two different sets of items in the CLIO Teacher's Rating Form—cooperative behavior and problem behavior. (Appendix C contains details on the construction of the child social competence scale.)

Parent Outcomes

Two types of parent outcomes were of interest: improved parenting skills and improved parent literacy. The hypothesis was that both help parents to be their child's first teacher. As with instructional outcomes, parent outcomes were analyzed both as outcomes and as mediators for child outcomes.

Parenting Skills. The parenting curricula implemented by CLIO projects focused on showing parents how to be effective teachers of their child and emphasized teaching early reading skills. It has been shown (Whitehurst and Lonigan 1998) that the practice of specific behaviors during joint book reading can promote children's engagement in reading and help them better comprehend the story and understand the conventions of print. Mutual questioning and responding, making stories relevant to the child's life, giving praise and feedback, explaining, physically sharing the book, monitoring a child's understanding, and adjusting language are all behaviors that enhance children's literacy skills and comprehension. Given the second primary research question of determining the added value of a parenting curriculum with a focus on child literacy, we developed the instruments for measuring parenting behavior with a particular focus on those aspects of parenting that theory suggested should promote child literacy.

Parenting skills were measured by coding videotaped parent-child interactions and by parent self-report. Both of these measured parenting behaviors that were thought to be important in differentiating parents who were more or less effective teachers (See appendix D for more information on the coding of the interactions.) A

total of 90 variables describing parenting behaviors were measured in the spring of 2005 and 2006, so some distillation was required. Instead of sorting the variables *a priori* into groups based on the literature of the field, the data on these variables were empirically combined into two outcome scales:

- Parent interactive reading skill, and
- Parent general responsiveness to the child.

The procedures used in this process included variable clustering and factor analysis within clusters. These procedures result in an unequal weighting of the items assigned to each scale. The scale for parent interactive reading skill has 49 items, while the scale for parent general responsiveness has 41. The correlation between the two scales is 0.6.

Despite the lack of *a priori* grouping, these two scales align fairly well with two primary dimensions of teacher quality at the pre-k and elementary level recently identified by Hamre and Pianta (2005): instructional support and emotional support. (See appendix D for details on how these scales were created.) They also align well with the goals set for parents by the CLIO parenting curricula.

There is no prior information on the reliability or validity of these scales. Some of the relationships explored in chapter 7 support the validity of the second scale in terms of its relationship with the targeted child outcomes. In appendix D, we provide information on the training of the coders and the ways in which we established rater reliability.

Parent Language and Literacy. Improving parent literacy is one of Even Start's main goals. While AE was not varied as part of the CLIO curricula, parent language and literacy have a strong relationship with child outcomes. Further, parent literacy may be positively affected by participation in parenting education with a child literacy focus.

The CLIO parent assessment was designed to measure English language and literacy outcomes, including vocabulary, basic reading, phonics, and comprehension. A single outcome measure was created from four tests: the PPVT and three Woodcock-

Johnson subtests (Letter-Word Identification, Passage Comprehension, and Word Attack). Using spring 2004 data (first plausible value of each IRT score), Cronbach's alpha for the scale was 0.95 (see appendix B for information about scoring procedures and psychometric properties for each of these subtests).

The Peabody Picture Vocabulary Test (PPVT-III) (Dunn and Dunn 1997) measures receptive vocabulary. In this test, the parent demonstrates his or her understanding of the meaning of a word by pointing to the correct picture after the test administrator reads a test word aloud.

Three Woodcock-Johnson subtests were administered (Woodcock, McGrew, and Mather 2001). Letter-Word Identification measures basic reading skills and requires respondents to identify printed letters and words with an oral response. There are 76 items in this subtest. Word Attack measures the subject's skill in applying phonic and structural analysis skills to the pronunciation of unfamiliar printed words. The subject reads aloud letter combinations that are linguistically logical but that form nonsense words or low-frequency words in English. There are 32 items in this subtest. Passage Comprehension measures comprehension and vocabulary skills. In the first several items, respondents point to the picture represented by a phrase. The remaining items require reading a short passage and supplying an appropriate answer for a missing key word. There are 47 items in this subtest. The test publisher's skip-out rule of stopping after six errors in a row was used for all three subtests.

Instructional Outcomes

If the curricula work as designed, significant changes in instructional practices were expected to occur. These changes were hypothesized to be necessary (if not sufficient) for impacts on children and parents. Knowing whether such changes occurred would be useful in interpreting the level of impacts on children and parents. Moreover, an understanding of how instruction changed in treatment projects is important to designers of future curricula. Although there was not a strong hypothesis about whether introducing research-based, literacy focused curricula would increase participation levels, level of participation was measured, since it was also a possible mediator of impacts on children and parents. Accordingly, systems were developed to measure instructional practices and participation.

Instructional practices were evaluated based on direct observation by experienced education researchers using standardized schedules, as is described below in more detail. As with parenting, many variables were created from these observational measurement systems, and so some distillation was required. From these detailed measurements, we developed eight instructional outcomes. Of these, five focus on ECE, two on PE, one on PC. In addition, based on monthly information from projects, we developed two participation measures—one for children's participation in ECE classes and one for parent participation in PE and PC classes. The alignment of particular measurements with the scales was straightforward because the intended scales guided the development of the measurement systems. However, not all the measurement elements worked as intended; some of these were dropped from the scales as discussed in appendices E and F to improve the reliability of the scales.

Preschool Instruction. The CLIO preschool curricula were intended to promote aspects of language development and emergent literacy skills that have been shown to be essential to proficient reading. As described by Whitehurst and Lonigan (1998), the elements of emergent literacy form two domains: (1) inside-out processes, which are rule-driven processes for rendering the written symbols of text into sound and vice versa (i.e., decoding and encoding), and (2) outside-in processes, which are sources of information outside the printed text, such as vocabulary, background knowledge, and contextual knowledge, that support understanding (and decoding) the text. Other terms used to describe emergent literacy are oral language and print motivation (outside-in), and phonological processing/sensitivity and print knowledge (inside-out). These terms are defined as follows:

- *oral language:* lexical/conceptual, semantic, and syntactic abilities,
- *print motivation:* interest in reading and writing activities,
- *phonological processing:* sensitivity to and ability to manipulate word sounds, and
- *print knowledge:* knowledge of units of print (letters, words), ability to translate print to sound and sound to print (letter-sound, and ultimately word-sound).

The primary mechanism hypothesized to improve developmental outcomes for Even Start children in CLIO is a preschool curriculum that focuses on teaching these

skills. The two preschool curricula were selected for CLIO, in part, because they include instructional activities in all four areas of emergent literacy, albeit differing in relative attention across areas.

To assess whether the curricula were successful in changing teaching activities in the critical areas of language and literacy, a classroom observation measure was developed specifically for the CLIO study: the Observation Measures of Language and Literacy Instruction, or OMLIT (Goodson, Layzer, Smith, and Rimdzius 2004, 2006). The OMLIT is a battery of six measures that focus on aspects of classroom practice that have been shown in research to support children's language development and acquisition of early literacy skills. Appendix E describes the development of and rationale for the OMLIT and provides psychometric information on the battery. There is no prior information on the reliability or validity of these measures.

Classroom observations using the OMLIT were conducted each spring in CLIO classrooms Along with the ECE OMLIT, observers also completed the Arnett Rating of Caregiver Behavior for each lead teacher (Arnett 1989). The Arnett rated the teacher's engagement with, responsiveness to, and affect toward children in the classroom. In the spring 2004 baseline data collection only, observers also completed the ECERS-R, which rates overall classroom quality in six classroom areas. (See earlier discussion about the ECERS-R under classroom instruction, pages 22-23.)

Five outcome constructs were derived from the six ECE OMLIT measures to correspond to key elements of preschool instruction that are being manipulated by the curricula. (Appendix E provides details on how the preschool instructional outcome measures were constructed.) These included constructs for the four components of emergent literacy, and an additional construct—the adequacy of language and literacy resources in the classroom—which is commonly considered to be related to children's emergent literacy (although no strong research evidence exists to support this claim). The five instructional outcome variables are the extent to which the preschool classroom provides:

- support for oral language,
- support for phonological awareness,

- support for print knowledge,
- support for print motivation, and
- adequacy of literacy resources in the classroom.

PE Instruction. Even Start requires that each project provide PE instruction, designed to increase parents' knowledge about early childhood development and parenting behaviors and practices, toward the objective of helping parents contribute actively and constructively to the literacy development and school readiness of their children. Prior research has shown that Even Start projects often use PE to provide instruction in many areas that are not directly related to child literacy or how to effectively interact with their children. Examples of topics in other areas include adult life skills, household management, health, and nutrition (St.Pierre et al. 2003). Given that the core strategy for the CLIO parenting curricula was to intensify the focus on child literacy, the study team decided to measure how parenting education time was allocated across these three broad areas: how parents can directly promote child literacy, how parents can interact more effectively with their children (abbreviated as "parenting skills"), and other topics.

An observational measure called the Parenting Education and Child and Parent Observation (PECAP) was created specifically for the CLIO study to measure the amount and type of activities being undertaken both in PE and PC classes. Appendix F provides details on the development of and psychometric information for the PECAP. There is no prior information on the reliability or validity of these measures.

Based on observations made each spring with the PECAP, two outcomes were created for PE classes:[12]

- the percentage of PE class time spent on child literacy activities: reading/looking at books/letters; writing/emergent writing; oral language, songs, rhymes, sound games; and

[12] The PECAP also records time spent on adult-focused activities, such as parent health and on other activities such as play activities, but these variables were not used in the CLIO impact analysis.

- the percentage of PE class time spent on parenting skills: responding to and managing child behavior; home-school relations; ideas for home play; child development; child health, well-being, safety.

Most important, from the perspective of this evaluation, is the percentage of PE class time spent on child literacy, since that variable is closely aligned with the central thrust of the CLIO parenting curricula, as well as with Even Start's broader guidance (U.S. Department of Education 2003) that PE should be directed at skills that allow the parent to be the "primary teachers for their children." The percentage of PE class time spent on parenting skills also is important because these activities may, in the long run, contribute to a parent's ability to be a good teacher for his/her children. The PECAP was revised between spring 2004 and spring 2005, and there were considerable missing data in spring 2004, so no baseline data were available for this measure.

PC Literacy Activities. The legislation authorizing Even Start requires that projects provide interactive literacy activities for parents and their children (U.S. Department of Education 2003). These activities may take place in preschool classrooms, as part of PE classes, in separate PC classes, or during home visits. As with PE, prior Even Start evaluations have shown that many Even Start projects use PC time for a wide assortment of non-literacy activities (St.Pierre et al. 2003).

The PECAP observational measure (described above in the discussion of PE outcome variables) was used to describe the amount and type of PC literacy activities in CLIO projects. Unlike PE, where the focus is on child literacy activities in which parents are being shown how to be their child's teacher, in PC literacy activities the focus is on literacy activities where the parent gets the opportunity to practice what he/she learned in PE by interacting with his/her child. The PECAP records whether each activity involves (1) parents only, (2) children only, (3) both parents and children, with parent/child pairs interacting together, or (4) parents and children but without any interaction in parent/child pairs. The outcome variable created from the PECAP data was

- the percentage of PC time in which parents and children were interacting on activities that were directly related to child literacy.

As with PE outcomes, changes in the PECAP from spring 2004 to spring 2005 and missing data in spring 2004 mean that no baseline measurement was available for this measure.

Extent of Participation in Even Start. It was hypothesized that the amount of Even Start instructional services received by CLIO parents and children might vary by study group. Perhaps families in the experimental groups were more engaged by the CLIO curricula and therefore missed fewer days of Even Start than families in the control group. The Instructional Services Participation Form (ISPF) was used to collect participation information from CLIO projects monthly. CLIO project staff were asked to report the number of hours of instruction in which each child and parent participated in each of Even Start's four instructional components (ECE, PE, PC, AE). Projects submitted data via an on-line ISPF data collection system, email, and fax. Editing and follow-up were performed on an on-going basis. Two outcome variables were constructed from the ISPF data:

- the number of hours per month that a child participated in ECE, and
- the number of hours per month that a parent participated in PE and PC.

These two scales were created by counting the hours that a child or parent participated in Even Start across a 9-month period (September through May)[13] and then dividing the total by nine—regardless of whether the participation was all within a single month or spread more evenly across months.[14] Children enrolled for only brief periods have low participation scores, as do children enrolled for longer periods but with rare attendance. Children with high weekly attendance over a long enrollment period have high participation scores.

[13] Although Even Start is intended to be a year-round program, projects may either not provide services in the summer, or the services may differ greatly from those provided during the school year. Reports from the summer months were particularly ambiguous. To reduce the impact of this ambiguity on the participation outcomes, participation was counted only from September through May of each year.

[14] We also have a 7-month version of each participation measure. The 7-month versions average participation hours from September through March. The 7-month versions were used as putative causal agents in some analyses in chapter 7 and thus need to avoid containing data about the period following the literacy assessments. Since chapter 3 is about the process that could have affected results, the 7-month version is also used there. The 9-month versions were used as intervention outcomes in chapters 5 and 6.